

# AMC-FAST

## Science Advisor



# Resource Book

*As of: July 2002*

## FOREWORD

*This Reference Book can be of great value to you. During your tour, and even before, questions will arise. You will find many answers right in this book. It provides information on the AMC-FAST Activity, your mission as a Science Advisor, how to go about your new job, and the support you can have. Appendix A on RD&A Organizations, provides information on the missions of and organizational structure of most of the RD&A organizations on which you will depend for support. There may be some discrepancies in the exact structures of the organizations since they are changing, however for the most part, they are up to date and will serve you well in determining who can provide you support. The AMC-FAST Directory, Enclosure I, provides you detailed information on Points of Contact throughout the RD&A community and how to contact them. Just in case you get technical questions about AMC-FAST, the AMC-FAST Junior Program or SEFEWS, the pertinent regulations are provided in Enclosure II. If you find a need for additional material in this book, please make a note and bring it to the attention of AMC-FAST Headquarters. Appendix B, Questionnaire Design Primer was prepared by an AMC-FAST Associate who is a professional in evaluation effectiveness of demonstrations. You will find it of great value in assessing your project demonstrations. Now, please review the Table of Contents of this book.*

**- For AMC-FAST Internal Use Only -**

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# Table of Contents

FOREWORD .....	1
TABLE OF CONTENTS .....	3
I. INTRODUCTION .....	5
A. Background .....	5
B. AMC-FAST Mission .....	6
C. Organization .....	7
AMC-FAST ORGANIZATION .....	7
AMC-FAST SCIENCE ADVISOR LOCATIONS .....	8
QUICK REACTION COORDINATOR LOCATIONS .....	9
II. ADMINISTRATION .....	10
A. Headquarters .....	10
B. Science Advisors .....	10
1. General .....	10
2. Specific Duties and Responsibilities .....	10
3. Helpful Hints For Potential/New AMC-FAST SAs .....	11
C. Quick Reaction Coordinators .....	14
D. AMC-FAST Communications .....	14
E. Support Equipment .....	15
III. AMC-FAST PROJECTS .....	15
A. Background .....	15
B. Conduct of a Project .....	15
1. Problem Identification .....	15
2. Solution Identification .....	16
3. Development of a Solution .....	16
4. Fielding Assistance as Requested .....	16
C. Project Record Keeping .....	17
1. AMC-FAST Project Summary Sheet (PSS) .....	17
2. Daily Information Summary (DISUM) .....	21
3. Monthly Report .....	22
4. AMC-FAST Project Book .....	22
D. Project Demonstration .....	23
E. AMC-FAST Projects and Environmental Matters .....	25
IV. PRE-ASSIGNMENT MATTERS .....	28
A. Preparation for New Assignment .....	28
B. Key Points of Contact .....	28
C. The Civilian Advisor in a Military World .....	29
D. Cooperation with the Staff .....	31
E. Relationship with the Chief of Staff .....	32

*Table of Contents: continued*

V. CHECKLIST AND EXAMPLES .....	33
A. Operational Needs Statement (ONS) Format .....	33
B. Project Summary Sheet .....	36
C. Science Advisor Checklist .....	39
APPENDIX A - REFERENCE MATERIAL ON ORGANIZATIONS .....	43
U.S. Army Materiel Command (AMC) .....	43
U.S. Army Materiel Command Deputy Chief of Staff for Research, Development and Acquisition (DCSRDA) .....	44
U.S. Army Aviation and Missile Command (AMCOM) .....	45
U.S. Aviation and Missile Command Research, Development and Engineering Center (AMRDEC) .....	46
U.S. Army Material Systems Analysis Activity (AMSAA) .....	51
U.S. Army Research Laboratory (ARL) .....	52
Computational and Information Sciences Directorate (ARL/CISD) .....	55
Human Research and Engineering Directorate (ARL/HRED) .....	56
Information Science & Technology Directorate (ARL/ISTD) .....	58
Sensors and Electron Devices Directorate (ARL/SEDD) .....	59
Survivability/Lethality Analysis Directorate (ARL/SLAD) .....	60
Vehicle Technology Center (ARL/VTC) .....	61
Weapons and Materials Research Directorate (ARL/WMRD) .....	62
U.S. Army Research Office (ARO) .....	63
U.S. Army Communications and Electronics Command/Night Vision and Electronic Sensors Directorate (CECOM/NVESD) .....	65
U.S. Army Communications and Electronics Command Research, Development and Engineering Center (CERDEC) .....	66
U.S. Army Developmental Test Command (DTC) .....	67
U.S. Army Engineering Research and Development Center/Topographic Engineering Center (ERDC/TEC) .....	69
U.S. Army Industrial Operations Command (IOC) .....	71
U.S. Army Soldier Biological Chemical Command (SBCCOM) .....	72
U. S. Army Space and Missile Defense Battle Lab (SMDBL) .....	73
U.S. Army Simulation, Training and Instrumentation Command (STRICOM) .....	75
U.S. Army Tank-Automotive and Armaments Command (TACOM) .....	81
U.S. Army Tank-Automotive and Armaments Command Armament Research, Development and Engineering Center (TACOM/ARDEC) .....	82
U.S. Army Tank-Automotive and Armaments Command Research, Development and Engineering Center (TARDEC) .....	85
U.S. Army Training and Doctrine Command (TRADOC) .....	87
APPENDIX B - QUESTIONNAIRE DESIGN PRIMER .....	89
ENCLOSURE 1- AMC-FAST DIRECTORY	
ENCLOSURE 11 - AMC-FAST REGULATIONS AND MEMORANDUMS	

## **I. INTRODUCTION**

### **A. Background**

The Army Materiel Command Field Assistance in Science and Technology (AMC-FAST) Activity was initiated in 1985 to bring AMC Laboratories and Research, Development and Engineering (RD&E) Centers (RDECs) into closer contact with their “customers”—the major Army commands throughout the world—and thereby provide the Army in the field with greater support and responsiveness to operational needs. The regulation which governs AMC-FAST is AMC-R 10-21, is located at enclosure II. To fulfill its mission, the program provides a network between AMC and the Army in the field as well as other services. The network consists of Science Advisors (SAs), Quick Reaction Coordinators (QRCs) and the AMC-FAST Activity HQ. The operation of the network is the responsibility of the AMC-FAST Director who reports to the Commanding General, AMC through the Deputy Chief of Staff for Research Development and Acquisition.

SAs are assigned to major Army operational commands, training centers and Unified Commands throughout the world. A current listing is provided at enclosure I, “AMC-FAST Directory”. They provide on-site technical advice and quick reaction solutions to technical problems. SAs have access to the Army’s Research and Development Community through QRCs.

The QRCs are located at ARL and research development and engineering centers. A current list of QRCs is provided in the AMC-FAST Directory. QRCs have been instructed to respond to requests from SAs within 72 hours (three working days). These requests can range from simple requirements for information to specific equipment development. The QRC’s initial response to the SAs request may be the complete answer or it may be just the provision of a point of contact. In any case, the SA can expect to have an answer within three days.

This network composed of SAs in the field, QRCs and AMC-FAST HQ has been successful in providing AMC a means of getting technology into the field and a knowledge of field needs to the RD&E community. The program has provided field experience to over 200 AMC Engineers and Scientists, it has tackled over 1000 projects, and has seen the introduction into the field of a number of its products. Some of these products have made major contributions in cost avoidance, improved capability, training and safety.

As an SA, you will find ample opportunity to continue the important work of identifying problems and coming up with technical solutions to those problems, assisting in introducing new technologies to the field and knowing the satisfaction of making our soldiers’ burden lighter.

The purpose of this handbook is to provide each SA with a compendium of reference material which will be helpful in addressing the responsibilities of this challenging position.

## **B. AMC-FAST Mission**

- Provide expert technical advice to Army commanders and their staffs.
- Demonstrate rapid solutions for materiel problems to soldiers in the field.
  - Improve performance
  - Improve readiness
  - Improve safety
  - Improve training
  - Save O&S costs
- Assist in preparation of material requirements documents such as Commander's Operational Needs Statements (ONS)
- Serve as vital communications link between soldiers and the material development community
- Foster professional growth for AMC scientists and engineers
  - Science Advisors
  - AMC-FAST Juniors
  - Scientists and Engineer Field Experiences with Soldiers (SEFEWS)

SAs play an essential role in the mission to foster professional growth. First, an assignment as an SA provides a unique opportunity for those selected to see how the Army uses the equipment AMC provides. Not only does the SA become familiar with the field army he learns a great deal about all of AMC. An assignment as a SA has become to be recognized as a valuable professional development experience. Second, the program offers scientists and engineers (GS-09 to GS-13) a chance to work with SAs on specific projects in its AMC-FAST Junior program. AMC-FAST also provides an opportunity for scientists and engineers to participate in field exercises in its SEFEWS program.

As the AMC-FAST Activity grew, it became obvious that the SA could not effectively address all the problems that were identified. In response to this need, LTG Thomas, previous AMC-DCG established the current AMC-FAST Junior program. This program permits SAs to request the services of a GS-09 to GS-13 engineer and/or scientist to assist on special projects for a specified period of time. This serves several valuable purposes. It provides for the solution of problems, it permits the SA to address more problems, and it provides the AMC-FAST Junior an opportunity to gain firsthand field experience. A copy of the HQ AMC Policy for the AMC-FAST Junior Program is included in this reference book at enclosure II, "AMC-FAST-Jr."

The SEFEWS program provides scientists and engineers the opportunity to participate in field exercises. Opportunities for SEFEWS assignments are provided to MSC POCs who attempt to match-up participants with an activity which is employing equipment of interest to the prospective participants. A copy of the AMC regulation governing the program is provided at enclosure II.



## C. Organization

The AMC-FAST organization is a separate reporting activity to AMC Headquarters, Unit Identification Code (UIC) W48PAA with three Table of Distribution and Allowance (TDA) positions for the Director's office. Seventeen (17) SA positions have been approved by the AMC CG. SAs remain on the TDA of their home organizations. There are 26 QRCs who are assigned their AMC-FAST responsibilities by their home organizations. This is in addition to their regularly assigned duties. The Director, AMC-FAST, reports to the Commanding General, Army Materiel Command through the Deputy Chief of Staff for Research Development and Acquisition (DCSRDA). Figure 1 provides an AMC-FAST organization chart, Figure 2 provides the location of AMC-FAST SAs and the commands which are served. (A current listing of SAs and their locations is provided in the enclosed AMC-FAST Directory.) Figure 3 provides the location of QRCs.

### AMC-FAST ORGANIZATION

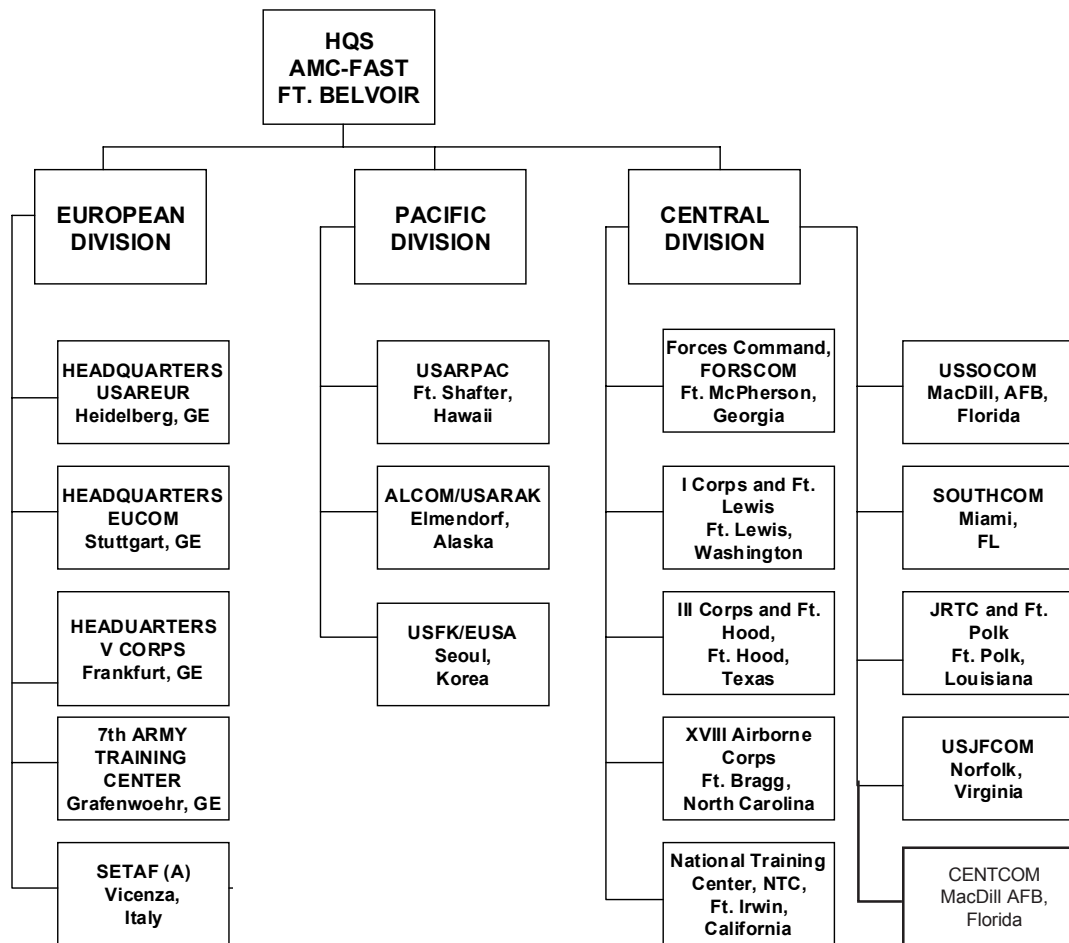


Figure 1: AMC-FAST Organization



## AMC-FAST SCIENCE ADVISOR LOCATIONS

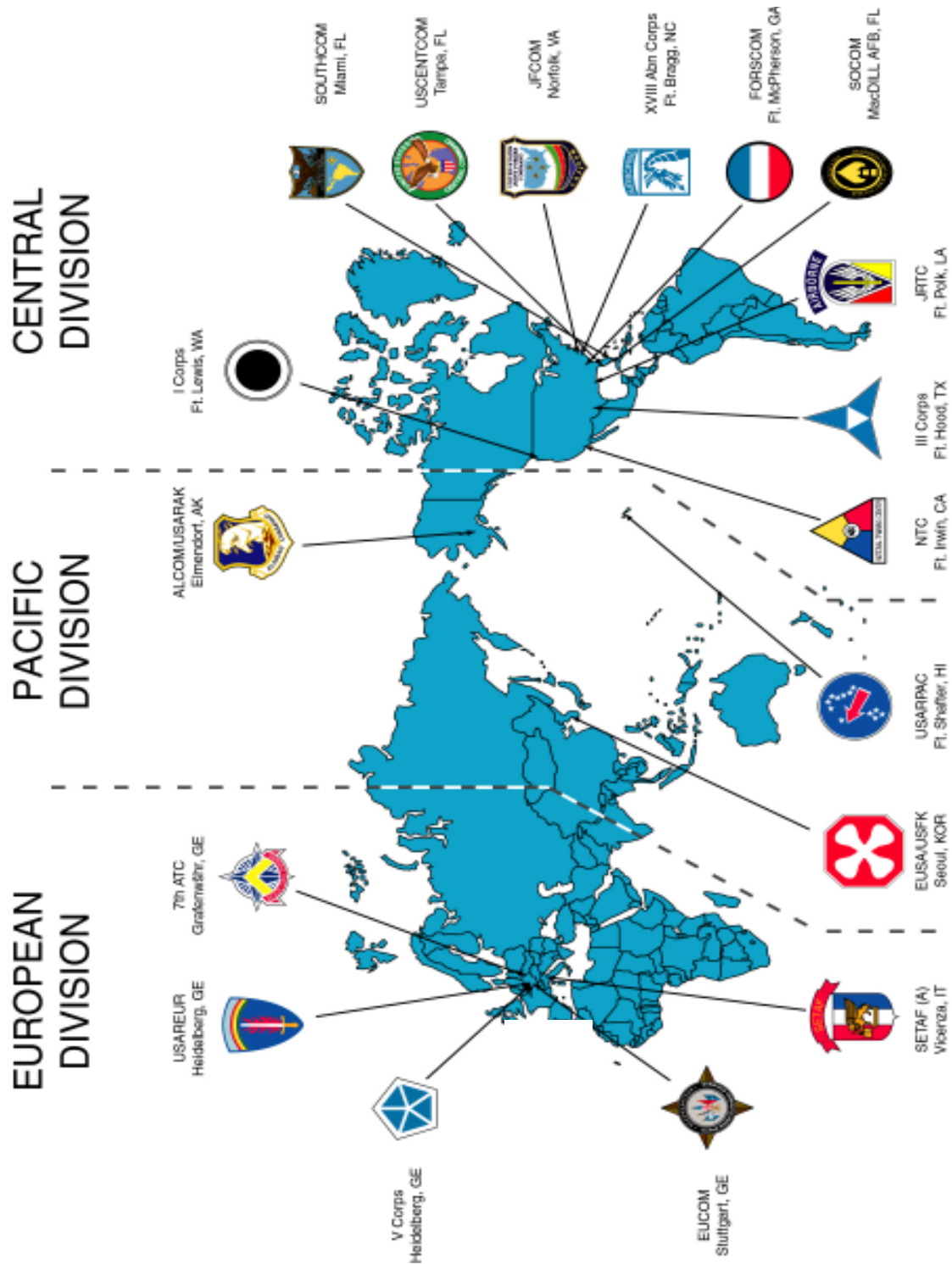
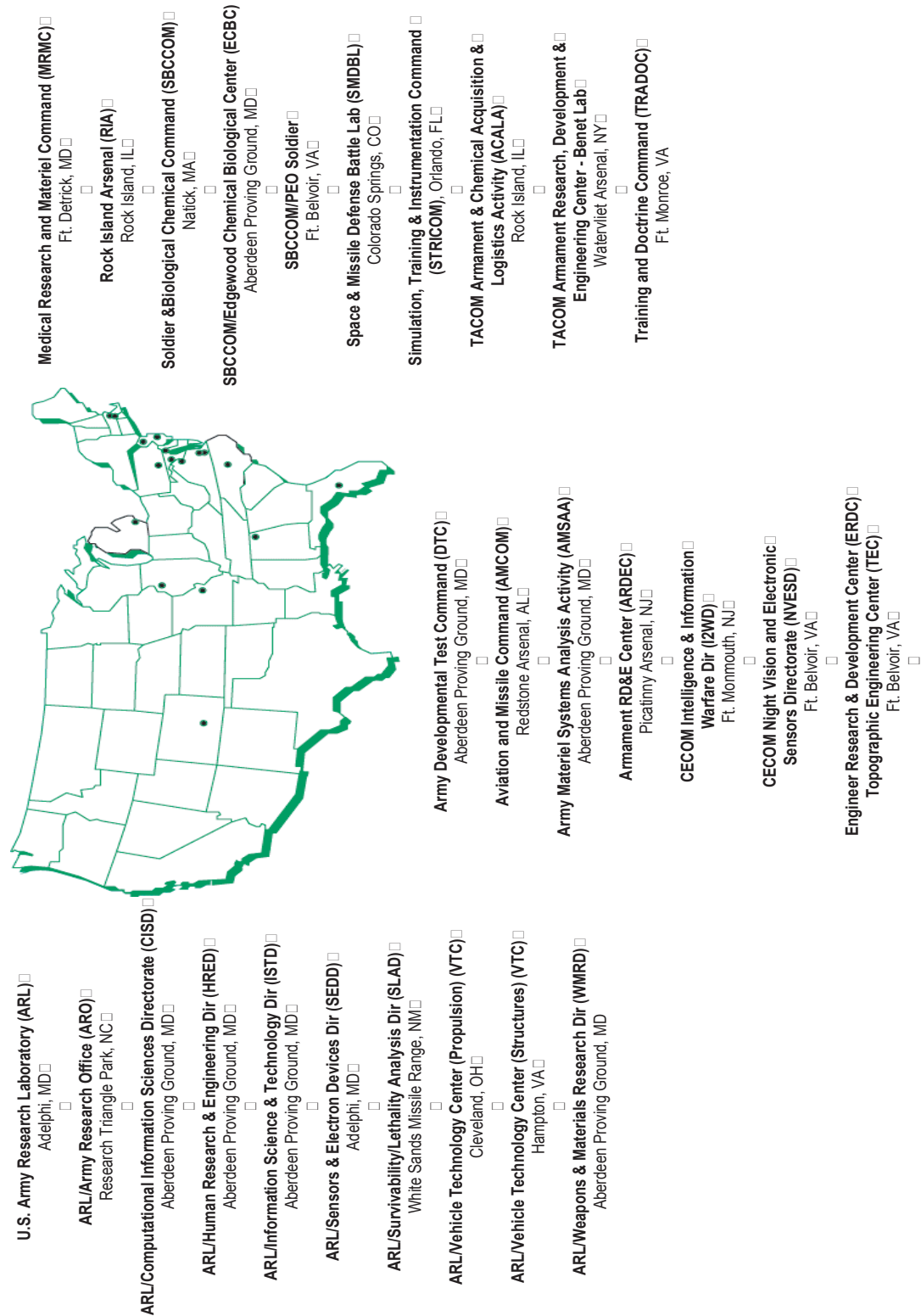


Figure 2: Science Advisor Locations

## QUICK REACTION COORDINATOR LOCATIONS



As of: Sep 02

Figure 3: Quick Reaction Coordinator Locations

## **II. ADMINISTRATION**

### **A. Headquarters**

The AMC-FAST Activity Headquarters is located in Building 374, at Fort Belvoir, Virginia.

The AMC-FAST Activity Office responsibilities include:

- Overall program and personnel guidance/direction, supervision of SA positions
- Recruitment, selection, assignment and training of the AMC-FAST Field Teams
- Assessment, selection, funding, and follow-up of AMC-FAST initiatives
- Preparation and administration of the AMC-FAST budget
- Development and execution of AMC-FAST policy

### **B. Science Advisors**

#### **1. General**

SAs are nominated by the Directors of their home organization, interviewed and selected by the Director, AMC-FAST and then presented for confirmation by the respective Commander of the organization for which they have been selected. Once approved, the SAs task is to serve as a personal staff officer to the Commander and to address technical problems affecting the overall command.

SAs serve by request of the host commander for two-year tours. These tours may be extended upon the request of the commander and approval of the FAST Director, MSC/RDEC Director, and HQ AMC Command Group. Extensions are granted only under exceptional circumstances, usually to ensure continuity of operations.

During their tours, the AMC-FAST team members represent the CG, AMC, for science and technology matters, and in addition, function as field focal points for all of AMC's Major Subordinate Commands, RD&E Centers and ARL.

#### **2. Specific Duties and Responsibilities:**

- a. Serve as technical and science advisor to the commander to whom assigned;
- b. Work directly with the operational command and devote time with soldiers and equipment in the field;
- c. Identify and report on areas where technology can enhance operational readiness;
- d. Initiate technology demonstrations;
- e. Coordinate activities with Logistics Assistance Officers (LAO's) and Program Managers (PM's) as appropriate;
- f. Use the Defense Data Network to communicate in real time with the AMC-FAST community and other appropriate activities;
- g. Keep Training and Doctrine Command Liaison Officers (TRADOC LNOs) informed of AMC-

FAST activities and assist the TRADOC LNOs and personnel of their Commander's staff in the preparation of requirements documents; (See TRADOC LNO listing in AMC-FAST Directory.)

- h. Responsible for tracking the status of all theater FAST initiated programs. The functions of the Science Advisor are explained on page 3 of AMC Regulation 10-21.

### **3. Helpful Hints For Potential/New AMC-FAST SAs**

#### **THINGS TO THINK ABOUT**

The decision to become an AMC-FAST SA should involve the total family. It is an assignment that will probably require a permanent change in duty station (PCS), will mean association with a new organization (many will be military), new schools for children, new pay and allowances, different medical facilities, you may live in a foreign country and have to adapt to local customs, you will be required to travel in support of the AMC-FAST mission, you may have to deploy with your unit in a military operation, and numerous other changes which may require adjustments by all family members. The following facts are provided to make the transition as painless as possible - they are not listed in any special order:

1. Pay may be adjusted by many factors. If you move within the U.S. (not Hawaii and Alaska), your Locality Pay Adjustment (LPA) may change. It may increase or decrease depending upon where you are working now and where you will be working as an SA. You may receive a temporary promotion that will increase your pay. If you move overseas (except Hawaii and Alaska), you will receive allowances called Living Quarters Allowances (LQA) and in some areas - Post Allowances (PA). These allowances are determined by your grade, your location and the number of dependents you have and are adjusted by the State Department every two weeks. In Hawaii and Alaska you are given a cost of living adjustment equal to 22.5% in Hawaii and 25% in Alaska (you will not receive LPA, LQA or PA). In all overseas assignments (including Hawaii and Alaska) NO LPA is given. This means that your base pay for annuity purposes may be reduced.
2. Government housing is not provided with the exception of Korea. This means that no LQA or PA is provided for the Advisor serving in Korea.
3. PX and commissary privileges are allowed in all overseas locations (except Hawaii and Alaska). Some items are rationed in some locations and selection may be very limited in some locations. Gas coupons and value added tax or sales tax relief is provided in some overseas locations (not Hawaii and Alaska).
4. U.S. Army medical facilities are available in all overseas locations except Hawaii and Alaska. Facilities may be limited and some care may have to be given on the economy. Your current health insurance plan will probably cover you, but you should check with them on specific limitations and requirements.
5. Some house sales expenses and benefits are provided for a PCS in the continental U.S. (not Hawaii and Alaska and not overseas). If you sell your home and move overseas (not Hawaii and Alaska) you will have an additional two years (total of four) to reinvest in a new home without incurring an income tax liability on the profit of your sale.

*Administration: continued*

6. The government will move one car to overseas assignments (includes Hawaii and Alaska). One car will be moved upon return. A different car may be returned, however it must be U.S. made or be the same make as the one shipped overseas. Most stateside insurance companies will not insure overseas. You must make arrangements for insurance when you get there. A letter from your current stateside auto insurance company (not an agent) indicating that you have a good record, may reduce your auto insurance premiums.
7. Military drivers licenses are required at all overseas locations for all family drivers (not Hawaii and Alaska).
8. Shipping firearms may be difficult to overseas locations.
9. On overseas assignments (not Hawaii and Alaska), personal household items can be shipped within certain weight limitations which is usually generous. Your items can be put in three categories - hold baggage, household goods and storage goods. The hold baggage is limited to about 100 pounds per person and is shipped up front so that you have necessary items waiting for you on your new assignment. Household goods are all the long term items you want to bring with you and will arrive later. The last category is long term storage. These are items you will not need and will be kept in permanent storage stateside. Total weight allowance between shipping and storage is 18,000 pounds. One caution on this item. The storage contract must be renewed every Fiscal Year. You must make sure that this is taken care of by your administrative support, or your goods could be sold. If there are furniture items you need overseas and did not bring them with you, they may be available from your local Director of Logistics (at your duty station). In Germany, this could include all furniture including lights and some appliances (dishwasher, refrigerator, etc.). In Germany and Italy, some apartments/houses may not have any light fixtures, kitchen facilities (including sinks, counters and cabinets), or closets. All of these items MAY be available from your local Director of Logistics. Availability will vary by location.
10. Make sure you bring all medical and personal records (birth certificates, school records, marriage certificates, passports, insurance papers, etc.) you may need while overseas. You may need certified copies of some items. Official personnel records can be left with your sponsoring organization or carried to your new assignment. There are advantages and disadvantages to both options. While overseas, there are allowances that vary every two weeks as a function of exchange rates. Normally, stateside Personnel Offices can not deal with this while overseas offices can. If you carry your official records with you, there maybe an interruption in pay, etc. You will be allowed an advance up to six pay periods to carry you through. There is another option to bring a copy of your record and bypass some of the problems. This would have to be worked between you and the two personnel offices. There is no one right answer on what to do.
11. In overseas locations (not Hawaii and Alaska) there are U.S. Banking facilities on post. Make sure you are prepared to make any necessary arrangements with any stateside banking or financial facilities before you move overseas.
12. Department of Defense school facilities can be used while overseas (not Hawaii and Alaska). Make sure you make any necessary arrangements for transferring your children to new schools. If you have children that are full time college students that remain in the states, you may be able to have them visit you once a year at government expense. There is an age limit of 22 for the student after that, the government will not pay. If your child turns 23 while visiting you, you will have to pay their return ticket to the U.S.

13. Jobs may be very limited for spouses at your new location. AMC-FAST can not make any arrangements for the employment of spouses. In overseas locations, spouses of military personnel (and maybe even local nationals) have hiring rights before civilian spouses.
14. On return from you FAST assignment, your sponsoring organization is required to provide you a position equal to your last position held there. It does not have to be the same position. If given a temporary promotion for your AMC-FAST assignment, it will probably terminate on your return to your home organization. Any other arrangements are strictly at the discretion of your organization and controlled by normal personnel rules. You are NOT exempt from RIF action while on AMC-FAST assignments.
15. On overseas assignments (not Hawaii and Alaska) you are still responsible for all federal and state taxes as if you never left home. This is even true if you retain no property in the state you left, unless you can prove you are not returning to the same state. If you return to the state you left and have not paid their taxes, you may be subject to fines, penalties, and a lot of heartburn. Federal employees overseas are not granted an exception from federal taxes up to \$75,000 per year like non federal Americans working overseas. Federal taxes may be filed three months late while living overseas without filing for an extension. However, you must pay any interest on money owed after 15 April but no penalties. It is best to file by 15 April (or an extension) because they may not realize that you are overseas and you may have to straighten things out.
16. Make sure you establish administrative and financial points of contact at your home organization to take care of time cards, travel orders, and other administrative details. Travel vouchers may be filed locally.
17. When accepting a move on an AMC-FAST assignment you must work at least one full year in your position or you may have to reimburse the Government for all moving expenses.
18. When making your PCS move, you will receive reimbursement for temporary living expenses for you and your family up to sixty days. Rental car expenses during this transition will NOT be paid by the Government. Delayed travel is authorized for your dependents.
19. After your PCS, you will have 70 days to file any claims for damage to furniture, cars and other personal items.
20. There may be special consideration for the movement of pets.
21. The SA you are replacing may have more current information for your new location.
22. If possible, you should arrange a TDY visit to the advisor you are replacing to learn details of the job, prepare for a smooth transition, and learn administrative details on where you are going.
23. On overseas assignments (not Hawaii and Alaska) you can accumulate annual leave carry over to a limit of 360 hours. You can maintain this level after you return. However, if after you return, your carry over in a given year is less than 360 hours, your carry over limit will be reduced accordingly, but never lower than 240 hours.



24. You are required to sign a deployment agreement when accepting an AMC-FAST assignment. This means that, if requested, you must deploy with your unit in time of crisis, or possibly forfeit government employment. You will be issued Battle Dress Uniforms (BDUs) by AMC-FAST that you may use during normal interaction with units in the field. This may be subject to rules at your local command. The uniform must be worn properly at all times and not mixed with civilian clothing. When asked to deploy in a crisis, you will be given proper training and issued additional field equipment as required for the mission.

## **CONCLUSION**

There are many factors to consider when making the decision to accept an AMC-FAST assignment. I have tried to list as many as possible above, but I'm sure that I have overlooked several that may be important to you. This office is not the final authority on any of the requirements and items listed above. Many of these factors change on a continuous basis. The best source for definitive information for your specific situation is your local CPO, Travel Office or Transportation Office. Please check with these organizations for an official determination.

The above section THINGS TO THINK ABOUT was prepared by Frank Tremain, former Science Advisor in Germany; Deputy Director, AMC-FAST; and Director, AMC-FAST.

**THE INFORMATION CONTAINED THEREIN IS NOT OFFICIAL AND IS PROVIDED ONLY AS GUIDANCE.**

**SEE THE APPROPRIATE ORGANIZATION OR REGULATION FOR OFFICIAL POLICY.**

### **C. Quick Reaction Coordinators**

The AMC-FAST QRC's function is to serve as the focal point for AMC-FAST communications at their respective locations. They assist the field team in both technical and administrative matters. In response to technical requirements, the QRCs can locate information or identify points of contact with particular expertise, and facilitate field team access to these resources. The QRCs are also used by their respective commands to gain contacts in the field. Keep in mind that no Science Advisor can be expected to know about every thing in the Army. QRCs are your best source of assistance. They have ready access to a huge storehouse of information and contacts throughout AMC. Even if you know someone to call on, please keep the appropriate QRC informed. This will ensure that the QRC is in the loop and help ensure that answers are coordinated.

The QRC function is explained on page 4 of AMC Regulation 10-21.

### **D. AMC-FAST Communications**

Normal communications among the advisors, the AMC-FAST HQs, and QRCs are accomplished by telephone, the internet, e-mail, front channel message, fax, regular postal service or Federal Express, news articles and Daily Information Summaries (DISUMs).



## **E. Support Equipment**

AMC-FAST provides advisors with support equipment with which to accomplish their mission. The advisor will receive a personal computer and printer, an e-mail box, photo equipment, field uniforms with accoutrements, a command briefing package and authorization for commercial telephone. The advisor is fully responsible for safeguarding of all equipment, software, or other related government property received.

## **III. AMC-FAST PROJECTS**

### **A. Background**

Although the conduct of projects is just one of the missions of AMC-FAST, it is in most respects the mission with the highest visibility. AMC-FAST projects have had significant impact on O&S cost savings and improvements in training, operational capabilities, and safety. The following material will highlight how projects are developed and how AMC-FAST maintains records on them. As distasteful as record keeping is to most people, it is essential in this business. The customer and the AMC Research, Development and Engineering Community need to know on a current basis what AMC-FAST is doing.

### **B. Conduct of a Project**

There are four basic steps in the conduct of a project. They are: identification of need; identification of a potential solution; development of solution (to include demonstration and evaluation) and provision of assistance in fielding as requested.

#### **1. Problem Identification**

SAs have identified scores of problems. There are more than enough to keep you, the new SA, busy. There are a number of sources to help you identify them. First, the commander, in addition to telling you his problems, he can assign priorities to them. The Chief of Staff and the Staff are also ready sources and they also speak for the commander. Beyond the commander and the staff, the soldier in the field encounters problems on a daily basis. You will be surprised at the ingenuity of the soldier in making quick fixes. Many of these fixes are so good that they should be standardized throughout the army. If you spend time on exercises, observe troop maintenance and just visit with the soldiers, you will identify more problems than you can solve. If you identify a problem on your own, check it out with your command and make sure that your command agrees with you. When you write up your problem statement, include in your statement who in the command states that there is a problem. This will help avoid the impression that the SA is pushing a certain product or pet idea. This does not mean that a SA should not introduce a new item or idea into the field, rather it is important to identify the need being addressed and the sponsor who wants something done. Before you try to solve your problems, however, spend some time to determine how big a problem it is, how wide spread the problem is, and if it can be solved with something other than a material fix. In other words, when you start to solve a problem try to think of the end result you want, a piece of equipment for local use, a new item of equipment for the whole army or something in-between.

## **2. Solution Identification**

Once you have determined that there is a problem that needs a solution, make sure that you let other people know about it. Someone may already be working the problem, a solution may be at hand, and you may be spinning your wheels reinventing the wheel. Your command should know that you have identified a problem. A word of caution: insure that when you are pointing out a problem that you do not make it look as though some one was derelict in their duty to allow such a problem to exist. The vast majority of problems which you identify are not the result of negligence, but result from unexpected uses, constraints in development, and other very natural causes. In addition to the command, you should notify TRADOC representatives, PMs, LAOs and other technical people who may be in your new command. Other sources of assistance are the Battle Labs. Satisfy yourself that others are not working the problem or that they need help. Once you have done this coordination, determine if there are local expedient solutions, search your mind to see if you have a solution, and consult your sources with emphasis on the appropriate AMC organizations. For every problem in the past, SAs identified at least one solution. Not all of the solutions have been good ones, but no one expects 100% success, that is why demonstrations and evaluations are held. Once you have identified a solution, make a plan on how it can be developed, how it can be demonstrated and how it can be funded. At this point you should submit a Project Summary Sheet (PSS) to AMC-FAST. You are in a good position to have your command's troops demonstrate and evaluate a project. Sometimes AMC Centers and ARL are available to produce prototypes. Then, the question of money raises its head. AMC-FAST has limited funds which can often be considered seed money - enough to get a project started. Centers and ARL have funds (sometimes), and if the problem being addressed is of enough interest to your command they will often put up funds. Once you have decided on a solution, discuss with all pertinent personnel (user and materiel developer) how it can be produced, how it is going to be financed and how it will be demonstrated, then it is time to go into development.

## **3. Development of a Solution**

Personnel requested to assist in solving identified problems need to know exactly the what, when, where, why and how the device will be used. As the prototype is being developed, plans must be made for the demonstration of the device, safety aspects need to be taken care of, and future plans developed based on various outcomes of demonstrations. The most successful AMC-FAST projects have been those that clearly demonstrated to the Command decision makers the value of the product. Once the Command supports a project, then transition to the respective materiel developer for further development or fielding— becomes much easier.

## **4. Fielding Assistance as Requested**

At the beginning of the AMC-FAST Activity, an SAs work on a project was seen as completed when a successful demonstration had been conducted. In some cases, products with a high value seemed to slip through the cracks. It was then determined that on completion of a successful demonstration commanders needed assistance in fielding the products demonstrated. Although AMC-FAST is not in the “fielding arena” the S&T support function of SAs makes it appropriate to assist in the fielding process as requested. This is a tough job; in order to do it, a strategy is required. This strategy needs to be developed in conjunction with the Commander, Director of AMC-FAST, TRADOC and the

responsible RDEC, PM/PEO Office and should identify the fastest way(s) of accomplishing the fielding. This strategy development should NOT wait until the demonstration, but rather should be on-going from the time the project is initiated. One of the keys to fielding, is the report of successful demonstrations. This should be provided to the AMC-FAST Director for his use in obtaining support. One of the most important contributions is providing assistance in the preparation of requirements documents. Regulations indicate that an effective document should be the Operations Needs Statement (ONS). Unfortunately, AMC-FAST experience with the ultimate tracking of an ONS has not been good. Even with that negative statement, ONSs have been effective in demonstrating the desire of the command to have a particular piece of equipment. A discussion of and an example of an Operational Needs Statement (ONS) are provided in Section V Checklists and Examples on page 29.

### **C. Project Record Keeping**

There are four records and reports which the SA must consider. The first project record required is the Project Summary Sheet (PSS). The second is the Daily Information Summary (DISUM), the third is a monthly status report, and the fourth is input for the AMC-FAST Project Book.

#### **1. AMC-FAST Project Summary Sheet (PSS)**

The PSS is used to enter project information into the FAST Management Information System (FMIS). Information from the PSS is used to generate several documents as well as answer general questions from AMC HQs on the project status. An approved PSS is required prior to the release of any AMC-FAST funding. The first document to be generated from the PSS is the AMC-FAST Project Book; the second is a workbook for the Annual Program Review. (See Section V for an example PSS.) Needless to say, the Project Summary Sheet must be very comprehensive. The Format of the PSS follows on page 18.

**PROJECT SUMMARY SHEET (PSS) FORMAT**

**PROJECT NAME:** (Short descriptive title that will not change. Title should reflect problem area, not equipment name.)

**PROJECT NUMBER:** (Assigned by AMC-FAST HQ)

**SCIENCE ADVISOR:** (Command and Name)

**PROBLEM:** (Short paragraph stating the problem. Information should include, but not be limited to, the name of the individual who identified the problem with unit, rank, phone number, and date problem was identified.)

**SOLUTION:** (Short paragraph stating the technical approach to solving the problem.)

**STATUS:** (Where the problem stands with respect to the solution.)

**NEXT STEP:** (What is planned for the next action and when. Include schedule of events when possible.)

**END RESULT EXPECTED:** (Improved readiness, improved safety, cost savings, additional capability. If applicable, need to state how item will get into inventory system.)

**FUNDING DID/WILL BUY:** (Demo, items for evaluation, etc.)

(BY FY)	FY01	FY02	FY03
<b>FUNDING REQUESTED:</b>	(AMC-FAST Dollars)		

**FUNDING PROVIDED:** (FAST Dollars)

**OTHER FUNDING PROVIDED:** (State source, amount, POC with phone number, etc.)

**AMC-FAST JUNIOR TASK:**

**START DATE:**

**COMPLETION DATE:**

**SPONSORING ORGANIZATION:** (Directorate with proper mailing address.)

**NAME:** (FAST JUNIOR)

**GRADE/RANK:**

**PHONE:** Commercial, DSN#

**FAX:** Commercial

**E-MAIL:**

**POINTS OF CONTACT:**

**USER/ORGANIZATION:**

**NAME:**

**GRADE/RANK:**

**PHONE:**

**FAX:**

**E-MAIL:**

**AMC RDEC/ARL:**

**ORGANIZATION:** (Include proper mailing address.)

**NAME:**

**GRADE/RANK:**

**PHONE:**

**FAX:**

**E-MAIL:**

**PEO/PM:** (SAME FORMAT AS AMC RDEC/ARL, ABOVE)

**TRADOC SCHOOL:** (SAME FORMAT AS AMC RDEC/ARL, ABOVE)

**BATTLE LAB:** (SAME FORMAT AS AMC RDEC/ARL, ABOVE)

**OTHER:** (SAME FORMAT AS AMC RDEC/ARL, ABOVE)

**REQUIREMENT DOCUMENT STATUS:** (Type of document, proponent, etc.)

**DISUMS/REPORTS:**

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**NOTE:** ALL POC's MUST BE ACTUAL CONTACTS MADE (NOT MERELY A NAME TAKEN FROM A PHONE BOOK) AND ARE STRONGLY DESIRED. (NA's will be questioned.)

**a. Several critical features of the Project Summary Sheet need emphasis:**

**Project Name:** You name it. Although “catchy” names may be helpful for promotional purposes, it is also helpful for the name to indicate the nature of the project. AMC-FAST HQ reserves the right to change names so that everyone is using a common name. Please use the final name assigned to the project when referring to the project. We will provide this information to you by sending a completed Project Summary Sheet to you via E-mail.

**Project Number:** AMC-FAST HQs will assign a number once the project has been approved.

**Science Advisor:** Your name and your command

**Problem:** What is the PROBLEM you are trying to solve and who said we have a problem. This is used in the AMC-FAST Project Book as part of the BACKGROUND/PROBLEM statement. A succinctly written identification of the problem will aid the Director in making approval and funding decisions. The genesis of this information is your contact with commanders, staffs, and soldiers. Be sure to state when and who (the names and positions) of those personnel who identified the Problem.

**Solution:** How you plan to address the problem.

**Status:** Initial entry will be minimum. Follow-on updates should provide the story of the project.

**Next Step:** What you plan to do and when.

**End Result Expected:** e.g. Demonstrate a solution. Assist in fielding a piece of equipment.

**Funding Did/Will Buy:** e.g. Off-the-shelf items

**Funding Requested/ Provided:** (self explanatory)

**Other Funding Provided:** Funds other than AMC-FAST.

**AMC-FAST Junior Task (required or not):** Note that there are a number of entries under the heading AMC-FAST Junior Task. Please remember that these entries refer to the AMC-FAST Junior. In a Training Program, the question arose about Sponsoring Organization, it is the organization that provides the AMC-FAST Junior.

**Points of Contact:** This is an excellent record of where you can go for follow-up actions and for new actions. In addition the list of POCs provides a ready reminder of whom you should inform of your activities.

**Additional Information:** Good photos will save and explain volumes of data. They are important to a busy proponent who must visualize the importance of the project which may be in tight

competition for scarce resources. Photos are also helpful in briefings, news releases, and reports. AMC-FAST HQ should be provided a photo depicting each project. The photo should contain some means of indicating size. The photo should have a title and description on the back which is written in pencil not ball point pen. Prior to each Program Review, AMC-FAST HQ will send you its latest copy of PSSs or project sheets and ask for an update. This insures accuracy of information and avoids unnecessary surprises at the Program Review.

An example Project Summary Sheet is provided in Section V on page 33 of this document.

#### **b. Project Standard Operating Procedure:**

**SAFETY:** In pursuing new projects, you may become involved in safety risks. You cannot be too careful. Maintain close contact with your local safety officer, review the Safety Verification Process Briefing found in Enclosure III, if in doubt, ask questions. Keeping safety as a basic necessary consideration, all SAs are required to follow this outline when a problem has been identified and you are initiating an AMC-FAST Project.

1. First make sure the problem has not been worked before or that another Advisor or some other organization is not working on the same problem. This can be done by E-mail to all other Advisors, all QRCs, AMC-FAST HQ and the Navy and Air Force through TriNET.

2. Submit a Project Summary Sheet to AMC-FAST HQ specifying the problem with a title and requesting funding. The summary sheet should identify the unit where the problem was identified with individual's name and phone number and when the problem was identified. Also identify the following: Proposed Solution, Funding Schedule, Supporting Organization (Lab, Center, etc.), TRADOC POC, PM/PEO POC, AMC-FAST Junior required, and requirement document information.

( NOTE: The above information must be complete include individuals, phone numbers, etc. Naturally, it may be incomplete initially, but must be completed as the project progresses.)

3. When the project is completed, make certain to notify AMC-FAST HQ and provide a paragraph describing the end results achieved.

## **2. Daily Information Summary (DISUM)**

The DISUM is an essential means of keeping AMC, AMC-FAST HQ, AMC Centers and ARL informed of key events in the development of a project and the activities of a SA. When major changes occur in project status they should be reported via the DISUM which is sent using the AMC-FAST DISUM Web Page. ***Note: All acronyms should be spelled out the first time used.***



### **3. Monthly Report**

AMC-FAST HQ requires SAs to submit a monthly report. Normally the command you are supporting will also require a monthly report. If it does, please do not prepare two reports. First satisfy the reporting requirements of your command, and forward a copy to AMC-FAST as well as, RDEC Tech Director and LSE Commander. The report should be a brief accounting of progress of projects and activities undertaken by the Science Advisor during the month which the report covers. This report helps the headquarters support staff track projects and can signal potential roadblocks to the Director. An example of a monthly report follows.

**SUBJECT:** January Monthly Report for V Corps

**PROJECT UPDATES:** (in this example the report covers each project that was worked on during the month.)

- **Quiet Reliable Generator (366):** Work continues at Pirmasens in modifying the M577. Work should be completed March 15, 1997, after which the M577s will be shipped to Saudi Arabia. FAST Jr completed all Mil-spec drawings.

- **Suitcase Trainers for Scouts:** New project, gathering information. Will submit project sheet shortly. This project may have AMC-FAST Jr. implications.

- **Urban Camouflage (432):** Nothing happened.

**OTHER ACTIVITIES:** Met with Navy SA and discussed wave propagation theories in an attempt to solve antenna problem within V Corps.

The purpose of the Monthly Report is to let your command know you are there and are contributing to their overall mission.

### **4. AMC-FAST Project Book**

Until the first quarter FY97, AMC-FAST published a Quarterly Report. This report was well received throughout the RD&A community, however, it was determined that news of AMC-FAST should be distributed in two ways. First, highlights should be put out on a monthly basis and a summary document should provide a comprehensive report on all current AMC-FAST projects. As a result, beginning with FY97 the Quarterly Report became a Semi-Annual Report and a monthly newsletter (FAST TRACKS) was published. Submissions from each SA were required to ensure that highlights of all AMC-FAST activities and projects were published in a timely manner. The publication of the monthly newsletter FAST TRACKS was suspended in July 2001, pending all review of policy relating to release of information which disclosed deficiencies and efforts to solve them. Responding to suggestions from several Science Advisors and a review of the document, it was decided to suspend the publication of the AMC-FAST Semi-Annual Report with the October 2000- March 2001 issue. To meet the de-

mands of informing the AMC-FAST community of project work as well as to inform the supporting commands, it was decided to publish the AMC-FAST Project Book. The book will provide one page for each AMC-FAST project. The project page will provide statements of the background, solutions, status, a photo and points of contact.

#### **D. Project Demonstration**

Project Demonstration is so key to the development of a product and its transition to the responsible ARDEC, PM/PEO for fielding, that it has been determined that special emphasis should be devoted to this subject beyond that mentioned in previous sections. A successful project demonstration is vital. A superb demonstration requires an extraordinary amount of coordination. You must see to it that every detail is attended to. To assist you in conducting demonstrations the following discussion on a demonstration plan outline is provided. It is based on actual field experience.

#### **DEMONSTRATION PLAN OUTLINE**

**BACKGROUND:** State the events that led up to the demonstration. Cite messages and memoranda on the topic, and include as enclosures.

**SCOPE:** Describe the general outline of how this demonstration will take place. For example, AMC-FAST may be providing equipment to be used by a certain field unit during training exercises. Include the dates of the exercises and the expected date of the final report. Describe the general data collection procedures, such as objective measurements where available and structured interviews with the soldiers using the equipment.

**OBJECTIVE:** This is what the CINC/Commander expects to get out of the demonstration. Usually, it is something along the lines of a set of attributes or specifications for an objective system. It may be to determine the feasibility of a technology as a basis for a follow-on demonstration. Or, the objective may be to put in place a demonstration system to solve completely a particular problem.

Note that from a contractual standpoint, the objective of a demonstration is NOT to choose which, if any, of the systems demonstrated would be the “best” for follow-on procurement. Check with your contracting office on this; a demonstration such as a “run off” is usually prohibited. It could be considered as conducting an “illegal competition” without informing the submitting contractors.

#### **RESPONSIBILITIES:**

a. AMC-FAST: List such responsibilities as receive and distribute equipment, coordinate planning and execution, conduct interviews of soldiers, assisting in writing the demonstration final report.

b. AMC Major Subordinate Command/Laboratory/Center: List their responsibilities such as purchasing the equipment and providing a AMC-FAST Jr. project engineer to assist in demonstration planning, train soldiers in operation and maintenance, conduct interviews and assist in data analysis and report preparation.

c. Troop Unit: List their responsibilities such as conducting the demonstration, providing soldiers to use and evaluate the demonstrated systems, provide after action sessions with soldiers in order to conduct the structured interviews. Usually it is best for the commander of the troop unit to “write” and sign the report, with the assistance of AMC-FAST and the AMC Lab/Center. The troop unit is usually responsible for providing logistics support and consumables for the demonstration.

**TEST ITEMS:** Describe the test items and include data sheets from the manuals on the technical characteristics.

**CRITICAL ISSUES:** These are the technical aspects of the systems that are investigated during the demonstration. Critical issues are useful to focus the demonstration and as a framework for the final report. Critical issues usually fall into the following five general areas:

- a. Does the technical performance of the system provide a significant increase in the military capability? Or, is the system a money saver? (This is the “performance” aspect of the hardware, and can be broken down into more detailed aspects of performance if necessary.) A determination will also have to be made if a new Military Occupational Speciality is required.
- b. Is the system sufficiently rugged to provide reliable operation in the hands of soldiers? (This is a general “reliability” issue.)
- c. Is the logistic supportability of the systems adequate? (This issue covers items such as use of consumables, maintainability, manuals, training, spare parts, special tools, test, measurement, and diagnostic equipment, etc.)
- d. Is the system safe when used by soldiers? (A safety Release may be required. If in doubt, see the Safety Officer.)
- e. Are the human factors engineering aspects of the system adequate?

**DATA COLLECTION PROCEDURES:** Include the structured interview instrument as an attachment if data is going to be collected on the basis of structured interviews of soldiers. Suggest the plan include some “objective” data such as system weights and measures, technical data obtainable from system manufacturers, and photographs. If systems from more than one manufacturer are being demonstrated, need to code the systems as Item A, Item B and so on, and plan to do the same in the final report. A removable code sheet is then produced for the plan and the report; the code sheet is removed if the plan or report is provided to the manufacturers.

**PROPERTY ACCOUNTABILITY:** State upon whose property books the equipment will remain during the demonstration, and the ultimate disposition of the equipment after the demonstration. Usually, the equipment is on the SAs hand receipt for the demonstration and either returned to the SA after the demonstration or transferred to the troop unit for permanent retention. The plan should note that while every effort will be made to conduct repairs on-site during the demonstration, there may be no spare parts available for the test items. Usually, if there is a major failure of an item, it will have to be withdrawn from the demonstration. The plan should note that the troop unit is “on its own” for repairs and/or spares if the test items are retained after the demonstration.

**DEMONSTRATION SCHEDULE:** Include as attachments the lists of tasks to be conducted by the soldiers during the demonstration. It is usually good to have an overall schedule chart. In working with the staff, you must obtain a project officer from the Chief of Staff to whom you can bring your concerns and get both counsel and assistance. You can not dump the demonstration on the project officer, so plan on doing a lot of coordinating.

## **E. AMC-FAST Projects and Environmental Matters**

**General:** The Army's wartime mission to engage and defeat the enemy takes precedence over all other considerations. In peacetime, the Army has the mission to train as it will fight and attain a state of readiness which will discourage potential enemies from resorting to the use of force. At the same time, the Army is a responsible member of our nation's society and those actions which the Army can take to advance our nations goals need to be taken. Our nation has had a long history of concern with the protection of our environment. This concern however has not been universal and with growth of industry and commerce, it has become obvious that there is a national as well as international requirement to do more to preserve our environment. In the civilian world, the balance of what is good for the economy and what is optimum for the environment is a subject of debate. In regards to environmental matters, the Army in carrying out its responsibilities, both voluntary and mandatory, must do its best to accomplish its military missions and to be a good steward of the environment. This is not always an easy task, but the Army has done a good job and AMC-FAST has made significant contributions. The following presentation of AMC-FAST activities related to the environment are provided as background for you our Science Advisors who are supporting our troops in all types of climates and terrain in both densely and sparsely populated areas.

### **Examples of AMC-FAST Activity Related to Environmental Matters**

**Industrial Pollution in Japan:** The AMC-FAST Science Advisor in Japan determined that the military installation on which she was stationed was subject to high levels of pollution from the surrounding industrial facilities. She solicited support from other members of her command's staff. Together they brought the condition to the attention of their command for further action.

**Noise Pollution:** In a number of locations and over a period of time, AMC-FAST Science Advisors have had to address the problems of noise created by guns, vehicles and aircraft. In particular the noise problem has received a great deal of Science Advisor attention within Germany. In 1988 at the Wildflecken Germany Training Area, the Science Advisor was tasked to investigate the noise problem of the 25mm cannon. Preliminary efforts focused on construction of shields of various types, however it was determined that this approach violated the principle of training as you expect to fight. The Science Advisor then obtained assistance of the Army Research Laboratory (ARL) in developing a muffler. Following some innovative research into sound suppression, which resulted in a scientific award, ARL scientists produced a prototype muffler. The prototype muffler was demonstrated, and desired changes identified. Prior to incorporation of the changes, it was determined that the range at Wildflecken would be closed and no further work on the muffler was accomplished; however it was again demonstrated in 1995. More recently (beginning in 2000), the German government has again revisited the application of its noise abatement laws at U.S. Army installations within Germany. The 7<sup>th</sup> Army Training Command Science Advisor initiated work to measure the intensity of sound created at the training areas in preparation to possible imposition of German laws.

**Training Ammunition:** There have been three significant areas of environmental concern related to training ammunition. Policing-up of spent brass cases after firing exercises is necessary, but a time consuming and costly effort. Our Science Advisor in Japan initiated a project which resulted in a product; “The Brass Case Catcher for the Squad Automatic Weapon”. The device was a simple bag which did not encumber the soldiers as they proceeded through their firing exercises. Its use greatly reduced the effort in policing-up the training area. In recent times we have become much more aware of the dangers of lead in our environment. AMC-FAST has been involved in the elimination of lead in target areas in two ways. In Italy, our Science Advisor demonstrated a Bullet Catch Target Backing System, which permitted the extraction of the spent lead from the target area in an efficient manner. Although not involved in the development of the lead-free training ammunition, our Science Advisors have been advised of its development and will be in a position to advise their commands on its use.

**Battlefield Energy Requirements and the Environment:** The capacity of the lithium battery does not degrade on a constant down-slope. Instead its capacity will remain at a relatively constant level, and without warning, suddenly degrade to uselessness. Individual soldiers, participating in missions, whose successful completion depended on battery power addressed the problem with the following approach: “New mission-new batteries”. This approach helped realize successful mission accomplishment, but at an extremely high cost. The FORSCOM Science Advisor determined that on an average lithium batteries were discarded with 50-70% of their life expectancy remaining. This waste of batteries created two costly burdens. First, lithium batteries are expensive. Second, lithium batteries must be treated as hazardous waste when disposed. In researching the problem the Science Advisor identified a lithium battery tester. The tester proved extremely valuable in providing the soldiers confidence that a used battery could provide the energy needed for operational requirements. In addition, the tester provided information on how much use could be obtained in non-critical operations.

Vehicle batteries also present a hazardous waste problem. The very nature of the Army’s extremely high demand for vehicles at a given time preceded and followed by relative long terms of light use create extremely difficult conditions for vehicle batteries. When vehicles are not run on a daily basis, batteries deteriorate at a high rate. Our III Corps Science Advisor identified a device which conditions batteries. This device has been demonstrated to greatly prolong the life of vehicle batteries. Through prolonging the life of batteries, cost avoidance is realized in both purchasing of new batteries and the reduction in the disposal of hazardous waste.

**Waste Oil Reutilization:** The III Corps Science Advisor identified a system which mixes waste engine oil with fuel to produce a mixture which is an efficient fuel for vehicles. Again, this procedure reduces the cost of fuel disposal as well as reduces the amount of fuel to be purchased. This device has been demonstrated at a number of installations and shows great promise.

**Rust and Corrosion:** One of the material problems common throughout the Army is vehicle rust and corrosion. The climate in the Pacific Theater highlights the problem. Our Science Advisors performed extensive research into the causes, effects and costs of rust and corrosion. Through their efforts the problem received attention at the Army level and a comprehensive program was initiated to decrease the effects of rust and corrosion. The possible extension of the life of vehicles and heavy equipment by only a short term will have a significant impact on reducing environmental concerns.



**Field Sanitation and Rubbish on the Battlefield:** Field sanitation touches on significant environmental issues. AMC-FAST projects and work have included the demonstration of equipment to eliminate body waste in Arctic conditions where normal disposal techniques do not work. In the Balkans, our Science Advisors have worked with the demonstration of small sewerage trucks which can service installations not reachable by the standard trucks. One of the environmental constraints which has become more prominent is the treatment of “gray” water. Differentiated from “black” water which is sewerage and medical waste, “gray” water is the run-off from showers, laundry and kitchens. Until recently ‘gray’ water was not a constraint on operations. It did become a constraint in the Balkans and will remain so. Our Science Advisors have had to provide advice on the disposal of gray water in their work on Camp Shower facilities and the Force Provider Project.

**Installation Grounds:** Our Science Advisor at FORSCOM was tasked to assist in evaluating the use of pesticides at FORSCOM installations. In 1996 FORSCOM spent \$2.2 million on pest control using 33,315 pounds of active ingredients. Through the introduction of sprayers which electrically charge droplets, it is expected that there will be a great reduction in the amount and cost of pesticides. Taking a page from the use of bacteria to eliminate the hazard of oil spills on water; our III Corps Science Advisor is investigating the use of bacteria to eliminate the spill of oil on soil.

**Summary of AMC-FAST Environmental Project Examples:** The examples of AMC-FAST environmental related projects fall into distinct categories. They are: the adaptation of off-the-shelf equipment and the development of new equipment. The identification of equipment resulted from individual research, suggestions by members of the command, responses from AMC Research Development and Engineering organizations, and unsolicited proposals. The Standing Operation procedure for you as a Science Advisor to obtain help in developing solutions is to go to our Quick Reaction Coordinators. This procedure also applies to environmental matters, however within the Army there is the Army Acquisition Pollution Prevention Office (AAPPSO) which has an overall view and responsibility for environmental matters. The following section will provide pertinent information on AAPPSO which will be of great help to you.

### **The Army Acquisition Pollution Prevention Support Office**

Team AAPPSO is composed of a Director at Headquarters AMC, the Environmental Technology Integrated Process Team; Six Commodity Integrated Process Teams, Army Partners and OSD Partners.

#### **Mission Statement:**

As a representative of the Army Acquisition Executive, the Assistant Secretary of the Army for Acquisition, Logistics and Technology and the Commanding General of AMC, the Army Acquisition Pollution Prevention Support Office:

1. Leads the Army’s Program to:
  - a. Eliminate the requirement for hazardous materials in the design, manufacture, maintenance, operation and demilitarization of weapon systems and materiel;
  - b. Reduce the acquisition of hazardous materials and uses of these materials in manufacturing and industrial processes;
  - c. Review and revise standardized documents including specification and standards to eliminate hazardous material requirements;

- d. Eliminate the use of Class I ODCs in weapon systems;
  - e. Assist Materiel Developers execute their environmental responsibilities as specified in Army regulation and the DoD 5000 series documents.
- 2. Serves as the Army's representative to the Joint Acquisition Sustainment Pollution Prevention Activity (JASPA).
  - 3. Serves as the ASA(LT) principal staff for all environmental issues affecting acquisition.

**Summary:** AAPPSON provided its organizational briefing at the 2001 AMC-FAST Science Advisors Training Program and Program Review. During its briefing, the capability of AMC-FAST to obtain assistance from AAPPSON was explained. The importance of establishing closer contact between AMC-FAST has been stressed and at future AMC-FAST Science Advisor Training Programs, Environmental Matters and the AAPPSON will be subjects of instruction.

Whenever you as a Science Advisor are tasked to address a problem with environmental implications, you are advised to contact AAPPSON. Their web page is <http://www.aappso.com>. If there is any difficulty in contacting AAPPSON, please contact one of our staff at Headquarters AMC-FAST and we will ensure that you are connected.

#### **IV. PRE-ASSIGNMENT MATTERS**

##### **A. Preparation for New Assignment**

It is of paramount importance that all new AMC-FAST SAs have an opportunity to visit the advisor they are to replace PRIOR to the actual assignment so they can become familiar with the requirements and environment of this new challenge. They should receive a thorough debriefing from the departing advisor in which he/she covers: Command reporting requirements, files, projects, equipment and property location and transfer. It is also important that the new SA be able to make personal arrangements for important administrative functions such as, delivery of household goods, family housing, finance and medical disposition, vehicle registration and delivery of mail. Scheduling to accomplish these visits will be arranged by the departing advisor. The requirement is to have the new advisor make a "door-to-door" move to permit rapid assumption of duties.

In the AMC-FAST Activity, it is the responsibility of the departing SA to arrange the activities for the incoming advisor. This responsibility will not be delegated, and a schedule will be forwarded to the incoming advisor to ensure that the requirements are understood.

##### **B. Key Points of Contact**

The new advisor should meet as many key points of coordination as possible during the pre-assignment visit. Scheduling the visit during the period of a training exercise or a commanders conference will assist in this regard. In addition to key personnel within the organization, the new SA should meet external points of coordination, such as the Training and Doctrine Command Liaison Officer, AMC Logistics assistance Officer and other Service SAs.



## **C. The Civilian Advisor in a Military World**

### **General**

As a Science Advisor in the AMC-FAST organization, you have been afforded a singular honor. You have the opportunity to enhance the combat readiness of our Army in the field. You will get to know and understand the challenges of the dedicated men and women who must use the materiel which AMC provides on the battlefield. Readiness is their mission...and so it is now yours. The more quickly you can become an accepted and contributing member of the team, the more influential will be your counsel. You will come to discover that military conversation is quite direct. There will generally be no hidden agendas. Within the ranks, Soldiers respect the spoken word. Within the Officer Corps, their word is their bond. All of them, both Officer and Enlisted, will simply expect you to be honest and straightforward. Congratulations on your assignment...we want the following to help speed your transition.

**1. Tradition:** The Army has many traditions which in many ways shape its culture. As a new Advisor, you need to know some of these. You have been issued your personal copy of The Army Officer's Guide (AOG).

**a. The Uniform:** The Uniformed Military personnel are proud of their uniform. The proper wear of each uniform is prescribed by Regulation. As a result when a Soldier wears the uniform, it is done properly. The basic uniforms are: the camouflage color BDU for use in the field, and worn with combat boots; The Army Green Uniform for use in garrison or headquarters; The Army Blue Uniform for use at ceremonies or special formal occasions. A cap is worn out of doors with all uniforms. The uniforms are never mixed. As a civilian working for the Commander and with the command staff, your dress should mirror theirs. When the commander wears the green uniform with tie, you should wear a coat and tie. When the Commander wears blues to formal occasions, you should wear a tuxedo or a conservative business suit. Off-duty, informal wear is acceptable and encouraged. However, you still represent the Commanding General of AMC. Your personal appearance can become a factor in the accomplishment of your mission. Don't jeopardize your success dress appropriately!

**b. Insignia of Grade:** Each grade in the Army from Private to General is provided with a specific insignia. It is important that you learn these quickly. Refer to charts of enlisted and officer insignia of grade in the AOG. When a soldier is to be promoted to the next higher grade, the soldier is called "promotable" and designated with (P) following the current grade. For example, a Captain (P) has been selected for promotion to Major, the next higher grade.

**c. Insignia of Branch:** Each branch of the Army has its own unique insignia, again with great tradition. For example, the Infantry Soldier wears crossed rifles, the Signaller wears crossed signal flags, etc. These insignia are worn on the collar. Refer to chart of all enlisted and officer insignia of Branch in the AOG.

**d. Awards and Decorations:** In addition to insignia of rank and branch, individual and unit awards and decorations for heroism and achievement are worn on the Green and Blue uniforms, and depict quickly the military history of the wearer. Refer to chart of all awards and decorations in

the AOG. Individual awards and US badges are worn over the left breast pocket in descending order of precedence from top to bottom. Unit awards and foreign badges are worn above the right breast pocket.

**e. Organizational Shoulder Sleeve Insignia:** Soldiers will wear a cloth organizational insignia of from 2-4 inches in diameter at the top of the left sleeve next to the shoulder seam. This represents the Army separate brigade, division, corps or field Army to which they are currently assigned. If the patch is worn on the right shoulder, it represents the unit with which the soldier fought in combat. The AMC-FAST SA has been provided with an organizational insignia and accoutrements which should be worn properly on the AMC-FAST field uniform at all times.

**f. Regimental Insignia:** Each of the tactical units of the Army has a distinctive Regimental insignia composed of symbols that can be traced to key battles in which that Regiment was distinguished by its bravery. The discussion of this lineage can be quite interesting, but here we want only to inform you that the insignia is generally metal, about 1 inch square, and worn on the shoulder straps of the Army Green or Blue uniform. Recently, the Army has adopted an American Regimental System to attempt to return Soldiers to units of their former Regiment for successive assignments. This Regimental crest is worn above the right breast pocket of the Green or Blue blouse.

**2. Military Courtesy:** Military courtesy is the term used to classify or include those special acts and ceremonial procedures which are required between members of the service, or which are habitually observed because of the equally strong force of custom and usage.

**a. The Salute:** The salute has been preserved as a greeting since the earliest times; at least since the times of the feudal knights who, in gesture of courtesy, raised the visor of their head armor to expose their face to the view of the other. This was always done with the right hand, by junior to senior. It is a sign of greeting between proud friends. As an SA, you will not give a military salute, but should always provide a verbal greeting to either a Soldier or an Officer. During military ceremonies during the pledge of allegiance or the national anthem, it is expected that you will place your right hand over your heart.

**b. Titles:** All Soldiers should be called by their grade and last name, from Private to General, i.e.; "Good Morning, Sergeant Smith." Warrant Officers are called "Mr."

**c. Ceremonies:** The military culture is rich in heritage and part of the climate building process involves ceremonies to commemorate special events. As a SA, when you are invited to attend a military ceremony it is expected that you attend, unless you have other matters of extreme importance. You will be expected to rise when the national anthem is played (all countries), when the national flag passes your position in the reviewing stand, and when honors are played for a General Officer (called Ruffles and Flourishes). Again, rather than salute, press your right hand over your heart for the flag and national anthem. In seating for the ceremony, you should be positioned to the left of any military or civilian grade who is senior to you.

One of the most traditional of ceremonies is "Retreat." Generally, Retreat is played on the bugle to mark the lowering of the national colors and the end of the duty day. This is also an appro-

priate time to pay tribute or to commemorate some achievement. The other bugle calls of great tradition are, “Reveille” to mark the raising of the national colors and the beginning of the duty day, and “Taps” to mark lights out in the late evening, and as the final salute to a fallen comrade.

**d. Invitations to military functions:** Invitations to military functions are just short of orders. Unless you are severely strapped, you should plan to attend formal and informal occasions to which you (and your spouse) are invited. Especially, go to visit your boss. They enjoy having you in their home and this is one of the few times when they can really get to know you as a person - outside of the duty environment. Whether you attend or not, you are expected to RSVP. Further, if you attend, it is courteous to send a note of thanks.

#### **D. Cooperation with the Staff**

The staff of your commander is structured according to Tables of Organization prescribed by the Department of the Army. There is a general and a special staff. The general staff consists of the principal staff officers whose functions are: Personnel (DCSPER), Intelligence (DCSI), Operations & Training (DCSOPS), and Logistics (DCSLOG). Most commanders now include a staff principal who is involved with civil affairs and when stationed overseas, with host nation activities. All other staff functions are special staff, to include: Comptroller, Engineer, Signal, Chaplain, Provost Marshal, and Surgeon. The AOG provides more information on the staff.

Individuals assigned to the field—especially at some distant spartan base—may be impatient with VIP visitors. Your visit must not be viewed as an inspection, but rather as an opportunity for them to identify a problem or problems (in perhaps even a non-attribution mode) which the scientific community can possibly solve.

In many headquarters staffs, there are sections whose functional duties closely parallel some of the activities of the SA—for example, force requirement determinations and equipment needs are normally performed by the DCSOPS. It is important to identify these staff sections and to introduce yourself to the section heads.

In larger staffs, particularly joint staffs, there may be enough interested individuals or even groups to warrant formation of a periodic R&D seminar. This requires relatively little organizational effort and if followed by a social hour, can greatly facilitate communication, cooperation and programs of common interest.

The SA must bear in mind his/her advisory status. Even when the advisor’s advice is accepted, acted upon and turns out eminently successful, it is the decision-maker — the commanding officer — who should get the credit, for the commander will surely bear the blame when things go wrong. In any event, it is good policy to be generous with credit. This is particularly necessary when briefing the Commanding Officer or the staff on projects to which other staff members have contributed. General Creighton W. Abrams used to say, “It is amazing what you can accomplish if you don’t care who gets the credit.”

Although a civilian is likely to be forgiven for being somewhat insensitive to strict protocol, it is a good idea to think over carefully your remarks rather than blurting them out. Generally, a question—if not impertinent—is safer than a declarative statement. In any event, the SA does not need to show how bright he/she is by frequent comment.

It is particularly important to understand how sensitive a military person is to anything that might reflect adversely on his knowledge or performance, especially in front of a superior or even peers. There is no need for you to criticize anyone (or anyone's actions or pet projects) in front of anyone else. In private, one-on-one sessions, criticism—even of the most constructive and helpful kind—should be offered only in the most positive sense in the form of feedback. Having provided this caution, however, it is just as critical that the commander or staff officer NOT go off and do something which could jeopardize the command or his soldiers when you can prevent it. You owe that loyalty.

In briefings and scientific explanations, know your audience. Many military officers hold advanced degrees in science or engineering. In addition to civilian educational institutions, officers attend many military schools. Some of these are: branch courses, Command and General Staff College, Service War Colleges, Industrial Colleges of the Armed Forces, the National War College, and Foreign Military Institutions. Do not talk down to your audience. A military staff usually has numerous traditions that manifest themselves in a variety of special protocols. For example, the seating around a conference table may be governed by a fairly rigid protocol rank, proceeding downward from the Commander's chair. As the new member of the staff you should check with the Chief of Staff's Executive Officer before the meeting to determine your seat.

The Senior Officer usually arrives at the meeting after notification that everyone else is there. It is customary for all to rise, as a mark of respect, when the senior officer enters the room and to remain standing until the senior officer is seated.

The Army in the field prides itself on being in good physical condition. That certainly makes sense as they may have to undergo some rather stressful activity on short notice! You will be expected to report in reasonably good physical condition. You are encouraged to take physical fitness training with your cohorts on the staff. That act alone can help gain acceptance.

### **E. Relationship with the Chief of Staff**

The commander looks to the Chief of Staff to be cognizant of everything that goes on in the staff. Thus, even though you may on occasion receive an assignment directly from the commander, you should immediately send a memorandum to the Chief of Staff describing this and your plan for carrying it out.

Although the SA receives support from the AMC-FAST HQs, there are some forms of support which must be received from the organization to which the SA is assigned. Examples are: housing assistance, office space, typing, Xerox, protocol, visitor support, conference support. Apart from the Commander, the Chief of Staff is the source of power, and the focal point of both resources and information. You need to have good relations with the Chief of Staff. Keep the chief informed of your travels and projects. Make a contribution to staff meetings. The Chief of Staff can provide you great assistance in the accomplishment of your mission.

This has been a fast overview of an organization that has established values and culture over 200 years. One final point: American soldiers are open and friendly. They will like you and take you into their confidence quickly. They need your talent applied to correct their problems, as they are often over committed in the defense of our nation. We are confident that you will not let them down.

## **V. CHECKLIST AND EXAMPLES**

### **A. Operational Needs Statement (ONS) Format**

1. Problem. Clearly define the deficiency or area to be improved. What cannot be done now that the materiel solution proposed will fix? What will be improved through use of the system?
2. Justification. Reason for urgency; impact of not having the system on readiness.
3. System Characteristics. To identify pertinent operational, physical and logistical requirements.
4. Operational Concept. How will the system be employed? Will it replace any current item of equipment?
5. Organizational Concept. Who will employ the system? At what organizational level?
6. Procurement Objective. Is the system to meet an operational requirement or is it for evaluation purposes only?
7. Support Requirements. What associated items of equipment are envisioned?
8. Availability. If known, indicate whether commercial or other services equipment, foreign or domestic, is available for off-the-shelf procurement.

NOTE: The ONS should be limited to three pages. It may include descriptive backup data if desired. The ONS for the MK19 Gun Mount is provided on the next two pages as an example.

*(Example ONS continued on page 34)*

**EXAMPLE**  
**ONS for MK19 Pintle Mount**

**1. Problem**

The current mount for the M2 and MK19 machine-guns (MK64 MOD7) and the M1025/M1026 armament carriers limits the operational capabilities of both machine guns.

a. The ability to effectively and accurately engage targets (both stationary and moving) with the M2 and MK19 machine-guns from the armament carrier, particularly in the free gun mode, is severely degraded by the instability of the firing platform (MK64 mount/pintle/turret ring interface), the inability to construct range cards (only minor shifts in elevation and deflections can be made with the traversing and elevation (T&E) mechanism), and the tremendous recoil effects of the weapons (e.g. difficulty of remaining on target).

b. Several MK64 mount/pintle/T&E interface problems exist. The system does not allow for bold changes in deflection (necessary for range cards) without adjusting the turret ring on the armament carrier. The T&E adapter binds on the pintle, causing erratic movement when engaging targets. In addition, there is interference resulting from the hand wheel of the T&E contacting the cradle on MK64 mount which prevents full elevation/depression of the weapon systems.

c. The current mount limits the speed at which the commander can change his combat capability. Changing weapon systems on the armament carrier from an M2 to a MK19, or vice versa, is severely hampered. Adapters and tools are required to change the weapon system mounted on the MK64 mounts. This change is time consuming and the required tools are not issued with the mount or the armament carrier.

**2. Justification**

a. Accuracy can be greatly enhanced, primarily for the M2 machine-gun, with a mount that can reduce recoil effects. Reduced recoil effects would result in smaller dispersions of rounds between and within each burst.

b. The increased probability of U.S. Armed Forces, particular the Army and the Marine Corps, being deployed in low and mid intensity conflicts around the world, coupled with the increasing likelihood of contingency operations, supports an increased role for M2 and MK19 machine gun mounted armament carriers.

c. Acquisition of an improved mount will significantly enhance the combat readiness and effectiveness of the all units, which have vehicular mounted M2 and MK19 machine guns. Commanders will be able to rapidly reconfigure their armament carriers with the appropriate weapon system according to the Threat.

**3. System Characteristics**

The improved mount must:

a. Be capable of mounting both the M2 .50 caliber and MK19 MOD-3 grenade machine guns in the ground and vehicle mounted role.

b. Be capable of mounting both the M2 and MK19 machine gun without requiring the use of tools or adapters.

c. Be capable of reducing the effects of the weapons recoil, resulting in a stable firing platform.



- d. Facilitate the preparation of range cards.
- e. Use the current T&E mechanism.

#### **4. Operational Concept**

The improved mount will:

- a. Be used to stabilize the M2 and MK19 machine guns when they are firing from vehicle or ground mounted platforms.
- b. Be used to improve accuracy and maintain effective fires once on target, primarily in the free gun mode.
- c. Be used to allow quick mounting/switching of either the M2 and MK19 machine gun.
- d. Be used to replace the MK64 mount.

#### **5. Organizational Concept**

The improved mount will be used to mount both the M2 and MK19 machine guns on the M1025/M1026 armament carriers, and when ground mounted on the M3 tripod.

#### **6. Procurement Objective**

The improved mount will meet an operational requirement in all units that have both M2 and MK19 machine guns vehicular mounted.

#### **7. Support Requirements**

- a. Operator and maintenance manual are required.
- b. No special tools are required.
- c. Initial training can be accomplished at the user level.

#### **8. Availability**

- a. The Navy's MK93 MOD 0 machine gun mount appears to satisfy the stated need. It mounts both machine guns and does not require the use of tools or adapters to mount either machine gun.
- b. The Navy's MK175 MOD 0 adapter appears to satisfy the need for the requirement to be able to construct range cards. The MK175 will also be beneficial when the need arises to make rapid and bold changes in elevation and deflection.
- c. Both the MK93 and MK175 are nondevelopment items and are ready for testing and/or procurement and fielding.

#### **9. Recommendation**

That the Army procure the MK93 MOD 0 machine gun mount and the MK175 MOD 0 adapter.



**B. Project Summary Sheet**

**EXAMPLE PROJECT SUMMARY SHEET**

**PROJECT NAME:** UH-60A COMMUNICATIONS UPGRADE

**As of:** 15 November 2001

**PROJECT NUMBER:** 1036

**SCIENCE ADVISOR:** Mr. David Bassett

**LOCATION:** I Corps and Ft. Lewis

**PROBLEM:** A request was received from the 54th Medical Company based on the need for a means of communicating with civil authorities such as the State Police, National Park Service, Sheriffs Department, Search and Rescue and other civil authorities during emergency missions involving the transport of injured personnel. Direct communication with ground based agencies during an emergency is essential in expediting the recovery and transport of injured personnel to the nearest medical facility for treatment. Every minute counts in these situations and the proposed radio installation could save valuable time in locating and coordinating the transport of injured personnel.

**SOLUTION:** Research has been done concerning the feasibility of installing a commercially designed VHF FM high band radio in UH-60A utility helicopters. This research was done at the request of the 54th Medical Company (Air Ambulance). It has been determined that a commercially available VHF FM radio is available which has the desired characteristics to fulfill this need. The radio identified is the Northern Airborne Technology model NPX138. Other commercially available radios that could fulfill the need are more costly than the NPX138 radio.

**STATUS:** Preliminary investigations have revealed that the installation of a compatible folded dipole antenna is needed to insure optimum operation of the NPX138 radio. Installation of an antenna such as the CI292-3 VHF FM antenna would optimize the operation of the NPX138 radio and also allow the continued use of the VHF FM #2 radio installed in the UH-60A helicopter. The other option would be to use the existing VHF #2 antenna in the tail section of the helicopter. This approach would necessarily require the disconnection of the VHF #2 radio.

**NEXT STEP:** At the present time an Air-Worthiness-Release is being staffed through AMCOM and should be finalized very soon. No actions will be taken until the AWR is finalized.

**END RESULTS EXPECTED:** The successful completion of this project will have a far reaching impact on the way Army MEDEVAC units communicate with other agencies involved in search and rescue operations. There is no substitute for good communications when lives are at stake.

**FUNDING DID/WILL BUY:**

- a. six NPX138 radios @ 3,671 ea = 22,026 + tax of 1,762 = 23,788
  - b. six CI292-3 antennas @ 126 ea = 756 + tax of 61 = 817
  - c. five installation kits and miscellaneous parts = 1,700
  - d. labor = 3,600
- TOTAL: Approximately 30,000

(BY FY)	FY2000	FY2001
<b>FUNDING REQUESTED:</b>	\$30,000.00	\$00.00

**FUNDING PROVIDED:** TBD

**OTHER FUNDING PROVIDED:** None

**FAST JUNIOR TASK:** N/A

**START DATE:** 3Q FY00

**COMPLETION DATE:** 4Q FY00

**SPONSORING ORGANIZATION:** CECOM

**ADDRESS:** I Corps and Ft. Lewis, WA

**NAME:** Jack Jory

**PHONE:** DSN 357-7275

**COMM:** (253) 967-7275

**E-MAIL:** joryj@lewis.army.mil

**GRADE/RANK:** DAC

**FAX:**

**POINTS OF CONTACT:**

**USER:** I Corps/Fort Lewis, WA; G-6 (Communications)

**ADDRESS:** HQ I Corps & Fort Lewis, WA 98433-9500

**NAME:** Michael Killen

**PHONE:** DSN 357-5250

**COM:** (253) 967-5250

**E-MAIL:** killenm@lewis.army.mil

**GRADE/RANK:** COL

**FAX:** DSN 357-5221

**AMC RDEC/ARL:**

**ORGANIZATION:** CECOM

**ADDRESS:** Ft. Monmouth, NJ

**NAME:** Bob Verhoven

**PHONE:** DSN 992-0457

**COM:** 732-532-0457

**E-MAIL:** verhoven@mail1.monmouth.army.mil

**GRADE/RANK:** DAC

**FAX:** DSN 992-0456

*Checklist and Examples: continued*

**PEO/PM:**

**ORGANIZATION:** TBD

**ADDRESS:**

**NAME:**

**GRADE/RANK:**

**PHONE:**

**FAX:**

**COM:**

**E-MAIL:**

**TRADOC SCHOOL:** N/A

**ORGANIZATION:**

**ADDRESS:**

**NAME:** TBD

**GRADE/RANK:**

**PHONE:**

**FAX:**

**COM:**

**E-MAIL:**

**BATTLE LAB:** N/A

**ORGANIZATION:**

**ADDRESS:**

**NAME:**

**GRADE/RANK:**

**PHONE:**

**FAX:**

**E-MAIL:**

**OTHER:**

**ORGANIZATION:** 62nd Med Grp, 54<sup>th</sup> Med Co.

**NAME:** Joseph B. Houser

**GRADE/RANK:** MAJ

**PHONE:** DSN 357-7344

**FAX:**

**E-MAIL:** houserjb@lewis.army.mil

**REQUIREMENT DOCUMENT STATUS:** TBD

**DISUMS/REPORTS:** None to date.

### **C. Science Advisor Checklist**

#### **BEFORE REPORTING DATE:**

1. Attend AMC-FAST SA Training Program.
2. Get in touch with the Advisor you are replacing to learn the unique things involved with PCS orders, moving, storage, allowances, local situations, etc., related to that particular location and assignment.
3. Visit the Advisor to become more familiar with activity.
4. Learn E-mail procedures and usage if you are not familiar with them.
5. Learn as much about AMC as you can to determine where to look for assistance with technical problems.
6. Establish contacts within your current home organization that will assist you with administrative problems while you are on assignment. Examples - Finance Office, Personnel Office, Travel Office, etc.
7. Learn procedures unique to AMC-FAST operation - establishing projects, Fast Jr., reporting, project summary sheets, AMC-FAST QRCs, chain-of-command, e-mail requirements, property accountability, etc.

#### **ON THE JOB:**

1. Know and adhere to the items on this list.
2. With current Advisor, meet all personnel in the chain-of-command and troop units that AMC-FAST is supporting and explain change over of SAs.
3. Get out in the field with all units of your command as often as you can, talk to the soldiers and unit commanders and find potential AMC-FAST projects.
4. Participate in command post and field training exercises with your command.
5. Be prepared to deploy on a contingency mission with your command if required.
6. Accept responsibility for all equipment assigned to the SAs Office (Including telephone credit card).
7. Provide a written report, monthly or bi-monthly, of activities to the CINC of Commander you represent as well as the Technical Director/Commander of your immediate supervisor at your home organization (copy to AMC-FAST HQ).
8. Provide input for the AMC-FAST Semi-Annual Report in a timely manner.

*Checklist and Examples: continued*

9. Keep the appropriate TRADOC representative and the appropriate PEO/PM informed when a new project has been initiated and as appropriate during the life of the project.
10. Keep other SAs informed when you are working on the same or similar projects. Look at what other Advisors are doing to avoid duplication.
11. Use Navy and Air Force assets.
12. Inventory all equipment every six months or as required by the responsible property book officer.
13. Prioritize projects within your command as appropriate.
14. Always obtain AMC-FAST HQ approval before obligating funds against a proposed new project.
15. Insure that funds are expended as planned. Inform AMC-FAST HQ as soon as possible when major changes or cancellations occur.
16. Use E-mail as the primary communications method and monitor daily (NOTE: Address E-mail messages to ONE individual as appropriate. If multiple names or fuzzy greeting are used, it may fall through the cracks).
17. Maintain and use the FAX machine and answering machine in your office.
18. Maintain constant contact with AMC-FAST HQ so that you can be reached at any time. Provide AMC-FAST HQ leave and TDY schedules include phone numbers and locations when away from the office.
19. Provide timely information to AMC-FAST HQ on any telephone number changes (office or home).
20. Provide FAST HQ once a year (1 October) a wish list of any software/hardware requirements.
21. Brief your parent command (Technical Director/Commander) once a year minimum on your activities.
22. Provide AMC-FAST HQ with frequent DISUM inputs.
23. Make sure QRC's are kept fully informed when you are visiting or dealing with their organization.
24. Know and adhere to all items on this list (All four sections).

**PREPARING TO LEAVE:**

1. Prepare a final report of your tour to the AMC-FAST HQ. Include lessons learned and advice for your replacement.
2. Be sure property is accounted for and prepare turn over to the new Advisor (include telephone credit card).
3. Provide the new Advisor with any information he/she may need for transition (information which helped you or could have helped you when you came on the job). Remember your experience as a new Advisor and try to make your replacement's experience easier.
4. Have clear and complete status of each project available to the new Advisor (include POC's, phone numbers, addresses and any other critical information).
5. Introduce the new Advisor to all personnel in the chain-of-command and troop units that AMC-FAST is supporting, explaining change-over of SA.



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## **APPENDIX A**

### **Reference Material on Organizations**

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#### **U.S. ARMY MATERIEL COMMAND (AMC)**

U.S. Army Materiel Command (AMC) is the Army's principal materiel developer. Headquartered in Alexandria, Virginia, AMC accomplishes its mission through 10 major subordinate commands that direct the activities of numerous depots, arsenals, ammunition plants, laboratories, test activities and procurement operations on over 5 million acres of property. AMC is in about 285 locations worldwide, covering 42 states and 14 foreign countries. Manning these organizations is a work force of over 66,000 dedicated employees, both military and civilian, many with highly developed specialties in weapons development and logistics. AMC's web page is located at: [www.amc.army.mil](http://www.amc.army.mil)

To perform its materiel development mission, AMC performs research in technologies which affect every aspect of the Army. As means of leveraging technologies are identified, AMC organizations enter into development and engineering. As a direct result of AMC's Research, Development and Engineering work, the U.S. Army is the best equipped in the world. The broad range of technologies, highly specialized application of technologies for extremely demanding uses, and the support of fielded equipment require AMC to have an organizational structure which allows for wide areas of independent action. At the same time, the structure must support exchange of information between the various elements. To meet this broad range of research, development, and engineering work, AMC has established a number of organizations.

With the current rapid changes in Army structure, it should be recognized that a document such as this will not be completely up-to-date by the time it is published. For that reason the "Information as-of Date" is provided on the front cover of this resource book.

**U.S. ARMY MATERIEL COMMAND  
DEPUTY CHIEF OF STAFF FOR RESEARCH, DEVELOPMENT AND ACQUISITION  
(DCSRDA)**

**MISSION:** Direct, integrate, facilitate, and administer AMC's research, development and acquisition programs that sustain the soldier's technological edge. Develop and implement initiatives to improve the technology generation and application, the acquiring, and the business management processes. Manage AMC's RDTE, procurement, and assigned DA and DoD appropriations. Perform assigned executive agent functions.

**PURPOSE:** To support the AMC Commander in acquiring and maintaining the soldier's technological overmatch against all threats -- technology that works for the soldier.

**VISION:** The Army's leader in Research, Development and Acquisition -- making technology work for soldiers and ensuring the highest payoff investment of the RDTE and Procurement Appropriations for the Army through the full and seamless integration of Science & Technology, Research, Development, Acquisition, Logistics Support and Soldier Readiness.

This is evidenced by:

- Seamless management
- Reduction in technology cycle times
- Reduction in operations and support costs
- Rapid fielding of new technology
- Dynamic innovative business practices
- High payoff investment
- Cutting edge acquisition techniques
- Effective use of resources, doing more with less
- Customer satisfaction
- Effective partnerships
- Continuous high level of positive feedback
- Affordable technology and accountable work force
- Effective information exchange and utilization
- One united RDA face to the customer

Excellence, routinely, in managing our business and supporting our Customers is our overarching objective at DCSRDA.

AMC Website: [www.amc.army.mil](http://www.amc.army.mil)

## **U.S. ARMY AVIATION AND MISSILE COMMAND (AMCOM)**

The US Army Aviation and Missile Command (AMCOM), is a major subordinate command (MSC) of the US Army Materiel Command. AMCOM is headquartered at Redstone Arsenal, Alabama.

AMCOM has approximately 7000 civilians and 450 military workers and the mission to:

- Develop, acquire, field, and sustain aviation and missile systems, united with program managers, industry, and other partners, to guarantee the Army's technological superiority on the battlefield.
- Conduct, perform, and manage basic and applied research and engineering, acquisition, integrated logistics materiel readiness management, advanced development and maintenance support functions for all assigned (aviation and missile weapons) systems/subsystems and associated equipment, and the test, measurement, and diagnostic equipment (TMDE) acquisition, logistics, and support.
- Execute assigned missions in support of Program Executive Officers (PEOs)/Project Managers (PMs), or other DOD elements having centralized management responsibility for specific weapon systems or items.
- Exercise command, control, and supervision of assigned activities and installations.

The Quick Reaction Coordinator at AMCOM is Ms. Laretta A. Mitchell, Phone: (256) 876-4270, FAX: (256) 876-8866, DSN: 746, Email: [laretta.mitchell@rdec.redstone.army.mil](mailto:laretta.mitchell@rdec.redstone.army.mil)

AMCOM Website: [www.redstone.army.mil](http://www.redstone.army.mil)

## **U.S. AVIATION AND MISSILE COMMAND RESEARCH, DEVELOPMENT AND ENGINEERING CENTER (AMRDEC)**

The U.S. Army Aviation and Missile Command, Research, Development, and Engineering Center (AMRDEC), Redstone Arsenal, Alabama, serves as the lead command for the U.S. Army Materiel Command (AMC) for research, development, procurement, and support of aviation and missile weapon systems. AMRDEC provides extensive scientific and engineering support to AMCOM project managers, AMC, and DOD elements having aviation and missile project or system management responsibility.

The two-fold mission of the AMRDEC is to provide research and development of aircraft and aviation and missile weapon systems. The Center plans, manages, and conducts research, exploratory and advanced development, provides one-stop life cycle engineering, technical, and scientific support for aviation and missile weapon systems and their support systems, plus, UAV platforms and robotic ground vehicles and any other assigned systems.

The AMRDEC is the research and development arm of AMCOM for Army aviation. Before any aviation item can be acquired, it must be researched, developed, and qualified. AMRDEC provides engineering support, conducts research into the latest technology for future systems and rotorcraft aeromechanics, executes the Army's airworthiness program, and explores available technologies for application. Within AMRDEC are the Aviation Engineering Directorate, Aviation Applied Technology Directorate, Aeroflight Dynamics Directorate, and Advanced Systems Directorate.

AMRDEC also functions as the lead Lab for technologies associated with guidance and control/terminal homing, propulsion, and high power/high energy lasers. Additionally, AMRDEC manages and operates Centers for Army inertial guidance and rocket propulsion and Redstone Scientific Information Center.

### **Advanced Systems Directorate (ASD)**

To act as the Command interface with Training & Doctrine Command (TRADOC) to determine air vehicle, aviation, and missile weapon system requirements. Serve as the Command focal point for all operational analyses. Interface with the technology community (Army Research Laboratory, in-house laboratories/centers, industry, other government agencies, and universities) to determine status and provide future directions in aviation, missile, rocket, high energy laser (HEL), directed energy (DE), unmanned aerial vehicle (UAV), and UAV technology as it relates to anticipated user requirements. Provide centralized planning, scheduling, direction, integration and utilization of exploratory and advanced development programs in aviation and guided missile technology. Provide the Command focal point for aviation and missile technology base tasks pertaining to technology transfer, assessment, and utilization. Seek out, evaluate, and integrate into AMRDEC's programs appropriate domestic and foreign aviation and guided missile technology. Manage aviation and missile technology transfer from foreign developers to the U.S. Government and from U.S. component/subsystem technology to aviation and missile application programs. Develop Army aviation and missile technology base plans and assure technology programs are consistent with plan requirements. Serve as the interface with the PEOs, PMs, and AMCOM organizations to ensure coordinated planning and transition of the Center's technology development programs in guided missile and aviation technology. Serve as AMRDEC interface with the Intelligence and Security Directorate for threat management and to maintain description of current and

future threats. Develop alternative concepts as solutions to current and projected user needs utilizing the latest current and projected technology. Develop and maintain Command long-range plans for aviation and missile weapon system acquisition and supporting research and development. Identify technology and nontraditional markets to support social and economical needs and promulgate horizontal integration of technologies. Act as AMRDEC interface on classified programs. Operate the AMCOM Qualitative Requirements Information (QRI) Program, Technical Industrial Liaison Office (TILO), Office of Research and Technology Applications (ORTA), Independent Research and Development (IR&D) Program, and the Small Business Innovation Research (SBIR) Program as these programs apply to missile and aviation systems.

### **Missile Guidance Directorate**

To conduct research, exploratory and advanced development, technology demonstrations, and provide engineering and scientific expertise in all aspects of missile guidance systems including sensors for the weapon systems function of alerting, detection, acquisition, identification and damage assessment; terminal guidance technologies; missile control devices; data links required for the missile guidance functions in semi-active, beam rider, and command systems and data links for unmanned vehicle systems; missile fire control functions; and hardware and software systems for missile systems functions. To serve as focal point for terminal homing technology, electronic counter countermeasure (ECCM), missile hardening, and Inertial Guidance Management and Technology Center. To provide technical and functional engineering support to all elements of the parent organization, AMCOM, PEO/Project/Product Offices, and other government activities in the above listed areas.

### **Software Engineering Directorate (SED)**

To evaluate terms of Army requirements in all phases of computer science and engineering and related technology in order to select, apply, and/or develop aviation and missile system computer hardware and software for the generation of computer resources for ground, airborne, air defense, land combat, and Command, Control, Communications, and Intelligence operations including built-in test capability. Plan and perform in-house technical consultation and guidance to aviation and missile system managers in the original development and acquisition of computer hardware and software for new and improved tactical/embedded/battlefield weapon systems requiring computer automation. Develop and implement policies, standards, and engineering practices and methodologies, which ensure effective development, acquisition, and post deployment sustainment of tactical computer resources for the Command weapon systems. Minimize and standardize the number of computer types and languages in the Command weapon systems. Plan and perform in-house software sustainment for Army aviation and missile systems in the post deployment phase. Perform verification and validation of mission critical software. Perform verification of interoperability requirements and design and conduct validation testing to ensure systems interoperability. Manage the software quality assurance program for aviation and missile systems. Plan, organize, and control the development, operations, and maintenance of a scientific Data Processing Activity required to perform the SED mission. Initiate the SED functions in a phased process. Activities prior to demonstration and validation (Advanced Development) phase are primarily consultative, transitioning to provide definitive guidance and direction at the point of preparation of Requests for Proposals and entry into engineering, manufacturing, and development. Execute all SED functions for all Battlefield Automated Systems (BAS) in engineering, manufacturing, and development including those systems not followed in the basic Material Acquisition Process. Provide software engineering evaluation and analysis for airworthiness consideration of flight and mission critical software for aviation BAS.



### **Propulsion and Structures Directorate**

To conduct research, exploratory and advanced development, and provide engineering and scientific expertise in all types of rocket propulsion technology, propellants, insensitive munitions, ignition systems, interior ballistic, gas operated power systems, propulsion systems controls, propulsion mechanics, structures, materials, warhead and fuzes, component integration of missiles, rockets, launchers, shelters, unmanned vehicles, fire control, and the development of prototype structures and propulsion systems. Conduct research, exploratory and advanced development, on demilitarization of rocket motors and the reclamation of propellants. Provide technical capability for structural design and analysis, thermodynamics, dynamics, solid and fluid mechanics. Evolve and analyze new weapon systems concepts. Perform development and exploitation of new materials for missile applications and fully characterize the materials capability. Provide mission related technical support to all elements of AMCOM, project managers, and other government laboratories and agencies.

### **Applied Technology Initiatives (ATI) Directorate**

Serve as AMRDEC technology executing activity, in concert with user organizations (i.e., Forces Command; Training and Doctrine Command) for development and integration of advanced technologies with evolving user requirements. Exercise full authority over all planning, direction, execution, and control of tasks and associated resources required to conduct experiments, demonstrations, and analyses to transition major non-project management system developments or product improvement efforts to validation phase decision points in a streamlined acquisition process. Formulate plans for and manage program funding, development, prototype production and fielding, and logistics support, as required.

### **Engineering Directorate**

To plan, develop, manage, and conduct AMCOM Missile and Aviation Programs in the areas of Total Life Cycle System Engineering, Product Assurance, Test and Evaluation. This includes Production & Quality Engineering, Manufacturing Technology, Command/DOD International Standardization, Configuration Management, Data Management, Microcircuits Obsolescence, Value Engineering, Prototype Fabrication, Automated Test Equipment, Reliability, Availability, and Maintainability (RAM) and Human Factors Engineering. To provide central staff supervision and functional (collocated and general) matrix support to the Product Assurance, Test & Evaluation, and Configuration Management processes for all AMCOM/AMCOM supported programs. Serve as the Command focal point for Product Assurance, and Value Engineering with all Command supported organizations (Program Executive Officers, program/project/product managers, weapon systems managers, and DOD, DA, AMC agencies and activities). To provide depot related Engineering support to all Command managed systems as required. To serve as Command focal point for all Engineering policy, guidance, and information, and data management.

### **Systems Simulation and Development Directorate**

To conduct missile research, exploratory, and advanced development and provide engineering and scientific expertise in aeroballistics, flight dynamics, aerodynamics, system performance analysis, statistical data and error analysis, system simulation, simulation theory and technology, analog/hybrid computer and interface system technology, math model verification and validation techniques, and real-time time-critical simulation technology. Assist in the evaluation and analysis of new weapon systems; provide technical and simulation support to all elements of the parent organization, Project Managers, and other government agencies. Provide facilities and technical expertise for the development, analysis and operation of missile system simulation, to

include digital, analog, hybrid, and hardware-in-the-loop simulations in support of weapon system development programs. Operate and maintain the Advanced Simulation Center. Serve as principal authority for the Command in the area of missile warhead (lethal mechanism and fuze) lethality and vulnerability analysis for air and ground targets, and survivability analyses for weapons systems, components, and other assets subject to enemy threat. Provide the full spectrum of scientific and engineering type automatic data processing (ADP) activities to support the Command missile missions; provide such support by agreement to other government activities; plan, develop, and program RDEC software application systems; plan, provide/coordinate access to off-site DOD computer systems; provide scientific computer systems analysis, programming, and computer services; maintain “state-of-the-art” technology in all areas of scientific and engineering concepts and equipment used in data processing; serve as staff advisor for assurance of effective and efficient use of Command scientific and engineering ADP systems resources. Meet AMCOM mission scientific and engineering computer processing requirements through research and development of a numerical analysis and digital computation nature; provide mathematical and digital programming activities; design, develop, modify, and maintain computer operating systems and subsystems; manage computers and associated peripherals; provide maintenance and contractor performance management functions for scientific computer systems; provide and maintain computer systems at the required security levels; research/analyze Command scientific computer requirements and develop/acquire computer hardware/software and communications network configurations to satisfy them; provide reference documentation, technical guidance, orientation, and assistance to computer users; provide/coordinate access to required computer resources not available within the Command; advise upper management in planning and acquisition of future computer systems, networks, and all aspects of interfacing compatibility for computer networks; manage and control the computer acquisition approval process for computer equipment required by RDEC; maintain “state-of-the-art” scientific computing technology.

### **Technical Management Directorate**

To provide scientific, engineering, and technical support, in accordance with the concept of full matrix management, for all program life cycle phases of assigned systems to AMCOM/AMCOM supported Project Managers (PM), and other Army Materiel Command and Department of Defense elements having project or system management responsibility. Plan, coordinate, direct, supervise, or monitor, as appropriate, the technical management of the design, development, pre-production/production/post-production engineering and design control efforts for assigned weapon systems to assure compliance with stated requirements, specifications, and program objectives.

### **Weapons Sciences Directorate**

To plan, perform, supervise and review basic and applied research in the physical and engineering sciences. Maintain cognizance of developing technology in the fundamental sciences and provide broad-based expertise as related to missile, laser, and beam weaponry. Devise and demonstrate improved methods of measurement and analysis as required by all elements of the parent organization in such areas as target signatures, electromagnetic propagation phenomena, electro- and magneto-optical interactions and materials, physics of the atmosphere, optical computing, and image processing, etc. Serve as a focal point for the coordination and development of weapons systems programs and technology transfer from many sources of scientific research to AMCOM weapons systems. Coordinate and evaluate basic research proposals submitted by the U.S. Army Research Office. Serve as focal point for the Command activity with the Defense Advanced Research Projects Agency (DARPA) by exercising overall technical and fiscal management of advanced research programs directed to AMCOM by DARPA and other DOD agencies. Enhance technology transfer from DARPA-funded programs to AMCOM weapons programs. Coordinate, monitor, and evaluate the developing tech-

nologies for high-energy lasers. Coordinate with TRADOC and other agencies to ensure integration of combat requirements and tactical concepts in the development of directed energy weapons systems. Conduct unconventional beam weapon systems design and analysis. Evaluate the effects of lasers, microwaves, and other beams on AMCOM weapons. Provide technical support and scientific and technical advice to other AMCOM elements, Army, and DOD agencies as required.

**Aviation Applied Technology Directorate (AATD)**

To develop and demonstrate the application of effective and affordable technology for current and future Army aviation systems through in-house and contracted R&D programs. To provide support to meet requirements of Aviation PEO, PM's, and special mission users.

**Aero Flight Dynamics Directorate (AFDD)**

To plan, manage, and execute research, exploratory, and advanced development programs assigned by the Director, RDEC, through independent in-house research and contracts. Assigned research and development programs are primarily related to aeromechanics, dynamics, and simulation of rotorcraft.

**Aviation Engineering Directorate**

Promulgate Army airworthiness authority authorizing flight of Army aircraft configurations within prescribed limits in accordance with AR 70-62. Serve as the AMCOM aviation focal point for the planning and execution of airworthiness assessments and qualification programs in accordance with AR 70-62 and technical design integrity engineering. Provide aviation engineering expertise for developmental, in-production, and operational aircraft systems and other related aviation materiel for Army field commanders, other AMC MSCs, DA, Aviation PEO, Deputy for Systems Acquisition (DSA), other AMCOM elements and Government agencies. Provide aviation engineering expertise/support for design techniques, system safety assessments, RFP preparation, Source Selection Evaluation Boards, and other technical evaluation groups. Provide life cycle aviation engineering support of developmental and operational aircraft systems and related aviation materiel. Identify deficiencies in fielded equipment; evaluate proposed changes; and provide recommended courses of action to aviation customers. Accomplish design engineering in support of the Command's NMP missions. Plan, program and manage Army aircraft engine component improvement programs, other assigned development and in-house engineering programs. Plan, manage, and execute the Flight Safety Parts Program and aviation Source Approval Program. Provide support and the U.S. Army Principal to the Aviation Engineering Board (AEB) of the Joint Aeronautical Commanders' Group (JACG).

The Quick Reaction Coordinator for U.S. Army Aviation and Missile Command is Ms. Lauretta A. Mitchell, Phone: 256-876-4270, FAX: 256-876-8866, DSN: 746, E-mail: [lauretta.mitchell@rdec.redstone.army.mil](mailto:lauretta.mitchell@rdec.redstone.army.mil)

AMCOM Website: [www.redstone.army.mil](http://www.redstone.army.mil)

## **U.S. ARMY MATERIAL SYSTEMS ANALYSIS ACTIVITY (AMSAA)**

AMSAA is located at Aberdeen Proving Ground (APG). AMSAA provides materiel and logistics systems analysis for the Army to support the decision making process. AMSAA performs analysis to reduce uncertainty in the development, fielding and support of materiel systems. From the initial identification of need, through concept and requirements definition, to the building of new systems and the ultimate fielding and support of those systems, the Army requires continuous analysis of effectiveness and performance in order to make prudent and informed decisions. AMSAA develops necessary analytical tools and methodologies and then exercises those tools to provide decision makers at all levels the information required to support those decisions.

Item-level performance data packages address capabilities and limitations in all major areas, such as: target acquisition, firepower, mobility, command and control, survivability, reliability, and countermeasure susceptibility. AMSAA has developed a logistics and readiness analysis capability to complement the emphasis on firepower analysis. Special logistics and readiness studies can be conducted for major Army commands. Over the years, AMSAA has matured into a “full-service” analytical organization with the capability to analyze equipment from all mission areas from a perspective that addresses: command, control, and communication (C3); mobility, survivability, firepower, reliability, and logistics.

New evaluation methodologies are being developed to meet changing times and special needs. Within the last several years, AMSAA, aided by the integration of the Inventory Research Office into its ranks, has expanded its role in the logistics, readiness and resource management areas. Provisioning models like the Selected Essential Item Stockage for Availability Method (SESAME) are used to support Project Manager logistics planning.

AMSAA vigorously supports efforts to develop effective RD&A policy for Army equipment to assist in force modernization. AMSAA has participated in the biennial Mission Area Material Plan (MAMP) and the Next Generation and Notional System (NGNS) selection exercises, as examples.

Effective 1 April 1997, the U.S. Army Industrial Engineering Activity (IEA) was consolidated into AMSAA. The merger of IEA into AMSAA creates a synergy in capabilities that will improve the industrial base planning and management process to address the changing DoD environment. An integrated analysis approach will include consideration and trade-offs among significant variables such as anticipated future military operations, wholesale and retail logistics requirements, manufacturing and future systems technologies, cross platform requirements, modernization planning and acquisition reform initiatives. Cost and risk will be analyzed across the planning horizon, looking at today and near term, mid-term and long term considerations. This methodology will ensure constrained resources are expended in those areas that offer the potential to provide the best value for future Army industrial base requirements.

Finally, AMSAA is active in the exchange of ideas and analyses with counterparts in friendly foreign governments. As such, our analysts are familiar with much of the ongoing analytical efforts in the five nation Technical Cooperation Program. In this regard, AMSAA may be helpful to the SA in closing the loop with the scientific community of any of the 5 member nations.

The Quick Reaction Coordinator for AMSAA is Mr. George Alexander, Phone: (410) 278-6742, FAX: (410) 278-6467, DSN: 298, E-mail: [galex@amsaa.army.mil](mailto:galex@amsaa.army.mil).

URL: [www.amsaa.army.mil](http://www.amsaa.army.mil)

## **U.S. ARMY RESEARCH LABORATORY (ARL)**

The U.S. Army Research Laboratory (ARL) of the U.S. Army Materiel Command is the Army's corporate, or central laboratory. Its diverse assortment of unique facilities and its workforce of over 1400 scientists and engineers make up the largest source of world-class integrated science and technology services in the Army. By combining its in-house technical expertise with those from the Federated Laboratories and other technology partners, ARL is able to maximize each dollar invested to provide the best technologies for our soldiers. ARL's program consists of basic and applied research (6.1 and 6.2) and survivability/lethality analysis (6.6).

### **VISION**

- A laboratory preeminent in key areas of science and technology relevant to land warfare;
- A staff widely recognized as outstanding;
- A partner with the Defense Community, close to Army users and seen by them as essential to their mission;
- An intellectual crossroads for the technical community, intensively interacting with academe, industry, and other government laboratories in the U.S. and abroad

### **MISSION**

Execute fundamental and applied research to provide the Army the key technologies and analytical support necessary to assure supremacy in future land warfare.

The ARL technical mission is performed by the five Directorates and two Centers in the following list.

#### **Computational and Information Sciences Directorate (CISD)**

- Manage the Army Advanced High Performance Computing (HPC) Research Center and operate and manage one of four DOD Major Shared Resource centers for HPC
- Operate, acquire, manage, and provide support to ARL scientific and business computing, communication, and networking assets
- Operate and manage ARL technical information and library resources

#### **Human Research and Engineering Directorate (HRED)**

- Soldier Visual and Auditory Perception
- Soldier Information Processing
- Performance Metrics for C2 and Complex Crew Functions
- Operator and Maintainer Workload Models

- Human Factors and MANPRINT Analysis Support to TRADOC and AMC RDECs (20 Field Elements)
- Human-System Design Tools for Front End Analyses

### **Information Science and Technology Directorate (ISTD)**

- Battlespace Visualization
- Weather decision Aids
- Defensive Information Warfare
- Atmospheric Effects
- Intelligent Agents
- Wireless Digital Communications
- Network Management

### **Sensors and Electron Devices Directorate (SEDD)**

- Multi-Domain Smart Sensors
- Bio-Chemical sensors
- Power Sources
- Electro-Magnetic Power Generation and Sensing
- RF Sensors and Device Technology
- Signal, Image, and Acoustic Processing and Recognition
- Photonics and Photonic Devices Technology

### **Survivability/Lethality Analysis Directorate (SLAD)**

- Integrated Survivability/Lethality Analysis (SLA)
- Conventional Ballistics SLA
- Information Warfare SLA
- Electronic Warfare SLA
- Chemical, Biological, and Nuclear Effects SLA
- Atmospheric/Battlefield Environment Effects SLA
- Live Fire Predictions
- SLA tools, Techniques, Methodologies R & D

### **Vehicle Technology Center (VTC)**

#### **Propulsion**

- Turbine Engine Technology
- Reciprocating Engine Technology
- Transmission Systems Technology
- Novel Propulsion Concepts



**Structures**

- Structural Analysis and Dynamics
- Structural Design Methodology
- Advanced Structures Concepts
- Non-Destructive Evaluation

**Weapons and Materials Research Directorate (WMRD)**

- Novel Armors
- Tank Gun Ammunition and Novel Penetrators
- Accuracy and Advanced Fire Control
- Electric Gun Technologies
- Composite Applications
- Ultra Light Armor and Structural Materials
- Transparent Armor
- Laser Ignition
- Low Cost Competent Munitions
- S & T for Future Combat Systems

Detailed descriptions of the Directorates and Centers follow this overview section.

Each Directorate and Center has its own Quick Reaction Coordinator listed.

The Quick Reaction Coordinator for ARL HQ is Mr. Joseph J. Spellman, Phone: (301) 394-3492, FAX: (301) 394-4971, DSN 290, E-mail: [jspellman@arl.army.mil](mailto:jspellman@arl.army.mil)

ARL Website: [www.arl.army.mil](http://www.arl.army.mil)

**U.S. ARMY RESEARCH LABORATORY  
COMPUTATIONAL AND INFORMATION SCIENCES DIRECTORATE  
(ARL/CISD)**

The mission of the CISD is to provide full spectrum scientific and business computing, communication, and networking operation and support services as a critical enabler to the ARL, Army, and DOD science and technology mission.

The Quick Reaction Coordinator for ARL/CISD is Mr. Nathan E. Boyer, Phone: (410) 278-6722, FAX: (410) 278-5075, DSN: 298, E-mail: [neboyer@arl.army.mil](mailto:neboyer@arl.army.mil)

ARL Website: [www.arl.army.mil](http://www.arl.army.mil)

**U.S. ARMY RESEARCH LABORATORY  
HUMAN RESEARCH AND ENGINEERING DIRECTORATE  
(ARL/HRED)**

In 1951, the Army recognized the need for “incorporating in the physical design of complicated mechanisms, design features which will permit the “average man” to realize the full functional potentialities of the equipment even under the most adverse operating conditions”. The result was the creation of the Human Engineering Laboratory (HEL) to conduct basic and applied research with the objective of optimizing soldier performance and soldier-machine interface. Over the next 40 years HEL grew to be nationally and internationally recognized in human performance research and human factors engineering technology development. In 1992, HEL was combined with the Systems Research Laboratory of the Army Research Institute for Behavioral and Social Sciences to become the Human Research and Engineering Directorate (HRED) of the Army Research Laboratory (ARL). This merging of prominent human factors and manpower and personnel integration (MANPRINT) organizations has served to focus, unify, and strengthen the Army’s program.

Centered at Aberdeen Proving Ground (APG), MD, HRED conducts research in the areas of soldier visual and auditory perception, soldier information processing, performance metrics for Command and Control, operator and maintainer workload modeling, human-system design tools for front-end analysis. In addition, HRED provides human factors & MANPRINT analysis support to combat (armor, infantry, artillery, etc.) and materiel (Missiles, Tank Automotive, Communications-Electronics, etc.) developers.

The modern facilities at APG include:

- A computerized obstacle course designed to evaluate soldier mobility and portability issues.
- A computerized firing range to examine soldier weapon performance issues.
- A state-of-the-art acoustics laboratory to study auditory processing issues.
- A vision laboratory designed for the study of night vision devices.
- A hostile environment simulator capable of reproducing much of the audible, visible, and tactile stimulation experienced in combat.
- State-of-the-art computer systems that support sophisticated human performance and human figure models.

In addition, HRED researchers have access to the instrumented test courses and firing ranges of the Army’s Test and Evaluation Command (ATEC) and ARL’s ballistic and survivability/lethality testing facilities at APG.

HRED currently has 131 professionals divided almost evenly among psychologists and engineers. Fifty nine percent of the staff have graduate degrees in their fields. While HRED is centered at Aberdeen Proving Ground, almost half of HRED’s 200 military and civilian personnel are located at 20 sites with combat developers or materiel developers and have unique access to advanced military equipment and highly trained troops.

HRED takes pride in the numerous contributions that it has made to the U.S. Army materiel development cycle during its 46-year history. The Directorate also looks forward to continuing its significant role in the areas of human performance research and human factors integration.

*ARL/HRED: continued*

The Quick Reaction Coordinator for ARL/HRED is Mr. Bruce Amrein, Phone: (410) 278-3529, FAX: (410) 278-3587, DSN: 298, email: [bamrein@arl.army.mil](mailto:bamrein@arl.army.mil)

For additional information about HRED, please contact Dr. Robin L. Keesee at DSN: 298-5800, Phone: (410)-278-5800, FAX (410)-278-9516. The mailing address is: Director, U. S. Army Research Laboratory, ATTN: AMSRL-HR, Bldg. 459, Aberdeen Proving Ground, MD 21005-5425. The e-mail address is [rkeesee@arl.army.mil](mailto:rkeesee@arl.army.mil)

ARL Website: [www.arl.army.mil](http://www.arl.army.mil)

**U.S. ARMY RESEARCH LABORATORY**  
**INFORMATION SCIENCE & TECHNOLOGY DIRECTORATE**  
**(ARL/ISTD)**

The Information Science and Technology Directorate (IS&TD) mission was expanded, under ARL's new organizational structure, to include the entire Battlefield Environment Directorate and the technical programs (Software/Intelligent Systems and Advanced Simulation) of the Advanced Simulation and High Performance Computing Directorate.

The reorganized IS&T Directorate has established three technical goals to enable ARL to more fully exploit the information technology explosion and to close the technological opportunities gap.

The first goal, Information Processing and Presentation, focuses on research to support evolving TRADOC doctrine and will address Battlespace Visualization Display Technologies, Weather Decision Aids, Software Engineering, Natural Language Software Agents, and Database Technology.

The second goal, Communications and Networks, focuses on research to impact future industry standards and will address Defensive Information Warfare, Multimedia Communications, Network Management, Information Distribution Technology, and Wireless Communications.

The third goal, Synthetic Environments, focuses research to Impact Standards and Protocols of the International Modeling and Simulation Community and will address Implementation of Physics Bases Models in the Simulation Environment.

The achievement of these goals is enhanced by the establishment of cooperative agreements, through the Federated Laboratory Program, with two consortia in the areas of advanced displays and telecommunications. Each consortia is comprised of an industrial lead, other industry partners, Historically Black Colleges or Universities and Minority Institutions, and major universities. This innovative approach teams Army researchers with the leading researchers in industry and academia and allows the Army to leverage the state-of-the-art research facilities of the consortia to build a scientific foundation for the digitization of the battlefield.

IS&TD will provide basic and applied research in digitization and communications science for Force XXI and Army After Next -- The generation after Force XXI.

The Quick Reaction Coordinator for ARL/IS&TD is Mr. Barry M. Fornoff, Phone: (301) 394-3871, FAX: (301) 394-3848, DSN: 290, E-mail: [bfornoff@arl.army.mil](mailto:bfornoff@arl.army.mil)

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**U.S. ARMY RESEARCH LABORATORY  
SENSORS AND ELECTRON DEVICES DIRECTORATE  
(ARL/SEDD)**

ARL serves as the principal Army organization for research and exploratory development in the physical sciences, with particular emphasis on electron devices and sensors technologies for Army battlefield applications. The research spans the electromagnetic spectrum, from DC (High-energy batteries and chemical capacitors), through the microwave (MW), millimeter-wave (MMW) and terahertz regions, to lasers and beyond. In addition, ARL serves as the focal point for technical management oversight of the Army's Low Observable (LO) Programs and development and demonstration of LO technology by application of state-of-the-art concepts, techniques and technologies involving low or reduced-visibility effects across fielded and developmental weapons systems. The directorate works on the forefront of technology and provides leadership in transitioning advances to the development community at large.

Innovative research is performed to advance the state-of-the-art in selected areas of the basic disciplines of physics, chemistry, bioscience, and electronics to meet Army combat needs and solve the critical technical barriers limiting the performance, reliability, and affordability of battlefield systems. This research contributes to the advancement of the technology base in solid-state physics, radiation effects, electro-chemistry, high frequency electronics, photonics, microelectromechanics, wide band-gap electronic materials, nanoscience, optoelectronics, biodetection, display phosphors, and fabrication process sciences. This applied to such Army needs as cooled and uncooled infrared detectors, lasers, optical systems, signal processing, and MW and MMW sensors. Innovative research is performed in sensor technology to provide affordable near-perfect situation awareness and rapid, precise discrimination and targeting of all threats in all environments and to execute the materiel implementation of the technology in support of Reconnaissance, Intelligence, Surveillance, and Target Acquisition (RISTA), fire control, guidance, and fuzing applications. Sensing technologies include signature modeling and simulation, single and multi sensor fusion target recognition, and signal processing for radar and acoustics.

Concentrating research and development in directed energy and power storage will provide the Army and DoD the capability for enhanced survivability of military systems and equipment to current and future directed-energy weapons threats, enhanced lethality of advanced directed energy weaponry, and development of RF weaponization technologies for use in operations other than war and to expand the flexibility for the warfighter. This includes the research in the critical area of power sources, such as affordable high-energy batteries and portable fuel cells.

The Quick Reaction Coordinator for ARL/SEDD is Mr. James Chopack, Phone: (301) 394-3194, FAX: (301) 394-4605, DSN: 290, E-Mail: [jchopack@arl.army.mil](mailto:jchopack@arl.army.mil)

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**U.S. ARMY RESEARCH LABORATORY  
SURVIVABILITY/LETHALITY ANALYSIS DIRECTORATE  
(ARL/SLAD)**

The mission of ARL/SLAD is to determine the survivability/lethality of Army systems to the full spectrum of battlefield threats.

1) Conduct the necessary investigations, simulations, lab/field experiments, and analysis to quantify the survivability/vulnerability/lethality of Army systems when faced with electronic warfare, directed energy, chemical, biological, nuclear and conventional ballistic threats, unintentional man-made effects (Electromagnetic, Environmental effects (E3), fratricide) and atmospheric effects.

(2) Act as the Army focal point for technical advice and consultation on survivability/lethality matters for decision makers, PM/PEOs, users, testers, independent evaluators and other customers.

(3) Provide independent, objective, well documented, technical judgements on complex technical issues regarding the survivability/vulnerability/lethality of Army systems.

(4) Perform special studies and make recommendations regarding techniques, tactics, or design modifications to reduce vulnerability and enhance lethality and effectiveness of Army systems.

(5) Design, procure, operate, and maintain the requisite facilities to support the Army's survivability/vulnerability/lethality program requirements.

(6) Serve as the Army focal point for soldier survivability and E3. To maintain objectivity, the SLAD will not normally develop or become an advocate of new survivability or lethality technology. However, the assessor will, when able, provide advice to system developers on techniques to reduce system vulnerabilities. Survivability technology activities will be performed throughout the other directorates of ARL. This situation creates a natural synergistic relationship between ARL's two principal business areas (technology and analysis). This directorate is a natural source of survivability technology requirements for the technologists to solve, whereas, the technology directorates in ARL provide the environment for the state-of-the-art technology awareness that is needed to perform accurate analyses of performance against an evolving threat.

The Quick Reaction Coordinator for ARL/SLAD is Mr. Connie E. Hopper, Phone: (505) 678-7952, FAX: (505) 678-1198, DSN: 258, E-mail: [chopper@arl.army.mil](mailto:chopper@arl.army.mil)

ARL Website: [www.arl.army.mil](http://www.arl.army.mil)

**U.S. ARMY RESEARCH LABORATORY  
VEHICLE TECHNOLOGY CENTER  
(ARL/VTC)**

The Vehicle Technology Center (VTC) of ARL conducts basic and exploratory research in structural and propulsion technologies.

Structural research is performed at the NASA Langley Research Center in Hampton, VA where Army and NASA scientists and engineers work jointly on programs involving structural mechanics and integrity, air/ground vehicle loads dynamics, crashworthiness, active noise and vibration control, and Non-Destructive Evaluation methodologies. This research provides the enabling technology needed to extend the life of existing Army vehicles and to design affordable future platforms having greater durability, lighter weight, improved crashworthiness, and reduced operational and support costs.

Propulsion research is carried out at the NASA Lewis Research Center in Cleveland, OH. The projects involve new gas turbine engine concepts and advanced power transmission systems for air and ground vehicle systems. The VTC is a major player in the joint development of the Integrated High Performance Turbine Engine Technology program and the Joint Turbine Advanced Gas Generator demonstration. VTC produces tools and understanding needed to design and fabricate engine systems with greater efficiency, lighter weight, enhanced reliability, and improved power output.

The Army partnership with the NASA Research Centers started in 1969 and has enabled Army scientists and engineers to leverage over 550 specialized NASA state-of-the-art, world class research facilities, and to collaborate on joint programs with highly regarded national and international experts in air and ground vehicle technology.

The Quick Reaction Coordinator for VTC (Structures) is Dr. Gary L. Farley,  
Phone: (757) 864-3091, FAX: (757) 864-3970, DSN: N/A, E-mail: [g.l.farley@larc.nasa.gov](mailto:g.l.farley@larc.nasa.gov)

The Quick Reaction Coordinator for ARL/VTC (Propulsion) is Mr. Gerald T. Montague,  
Phone: (216) 433-6252, FAX: (216) 977-7051, E-mail: [gerald.t.montague@lerc.nasa.gov](mailto:gerald.t.montague@lerc.nasa.gov)

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**U.S. ARMY RESEARCH LABORATORY  
WEAPONS AND MATERIALS RESEARCH DIRECTORATE  
(ARL/WMRD)**

**MISSION**

The mission of the directorate is to enhance the lethality, survivability, and strategic deployability of the individual soldier and the Army's advanced weapons systems.

**FUNCTION**

(1) Provide synthesis, analysis, characterization, testing, processing and manufacturing technology in polymers, ceramics, specialty organic materials, and composite materials. Provide modeling, design methodology, testing techniques, dynamic response, and computational mechanics of monolithic, hybrid, and multifunctional materials.

(2) Plan, conduct, and evaluate basic and applied research in interior, transitional, and exterior ballistics. Analyze the mechanical and aerodynamics aspects of the launch and flight of projectiles and missiles.

(3) Develop and conduct comprehensive technology base and customer programs in penetration, terminal effects, advanced armor concepts, energetic and composite laminate armors, munition.

(4) Serve as the principal focal point for research, applications, and simulations for survivability and lethality technologies.

The Weapons and Materials Research Directorate (WMRD) is located at Aberdeen Proving Ground, MD. The site contains several unique facilities for the study of ballistics and weapons research. The new state-of-the-art scientific facility, Rodman Materials Research Laboratory, was completed on 29 July 1996 to house the laboratories of the Materials Division, moving from Watertown, MA.

The directorate works very closely with several external laboratories. The Institute for Advanced Technology (IAT) is an extended laboratory partner associated with the University of Texas that conducts basic research in electrodynamics and hypervelocity physics related to weapon systems and military applications. Also, three Materials Centers of Excellence form a close partnership between WMRD and university laboratories: Composite Materials Science at the University of Delaware, Dendritic Polymers at the University of Michigan, and Advanced Materials Characterization at Johns Hopkins University.

The Quick Reaction Coordinator for ARL/WMRD is Dr. Michael McNeir, Phone: (410) 278-3869, FAX: (410) 278-9969, DSN: 298, E-mail: mcneir@arl.army.mil

ARL Website: [www.arl.army.mil](http://www.arl.army.mil)

## **U.S. ARMY RESEARCH OFFICE (ARO)**

The ARO develops, manages, and coordinates basic scientific research in the physical and engineering sciences, materials science, geoscience, biology and mathematics in response to Army-wide requirements.

The ARO is a separate reporting activity to the U.S. Army Materiel Command (AMC) Headquarters reporting through the Deputy Commanding General for Research, Development, and Acquisition. As an executive agent for AMC, the ARO links the Army to the world-wide community through contracts and grants to educational institutions, and government and industrial laboratories.

In addition to developing the AMC's research program, the ARO also reviews and coordinates the Basic Research (6.1) efforts of the AMC Research, Development and Engineering Centers and Laboratories; reviews and analyses the industrial Independent Research and Development (IR&D) program for coordination with the entire AMC Technical Base Program; provides Army R&D leadership with technology assessments and forecasts, and evaluations of unexpected scientific breakthroughs for Army application.

Over the forty years since the establishment of what has become the ARO, supported research has lead to nine Nobel prizes. Scientific areas supported which have lead to Nobel prizes include: nonlinear optics, superconductivity, quantum electronics, precision atomic spectroscopy, borohydrides and organoboranes.

The ARO has a strong management role in implementing several DoD/DA programs which coordinate research among industrial, small business, academic and other institutions. These programs include the Advanced Concepts & Technology (ACT) II Program, the Multidisciplinary University Research Initiative (MURI), the University Research Initiative (FRI), the Defense University Research Instrumentation Program (DURIP), and the Small Business Innovative Research (SBIR) and Small Business Technology Transfer (STTR) Programs. In their own special way, each of these programs encourage the application of new science and technology to Army Problems.

The ARO is also the "window" to the academic communities in Europe, the Middle East and the Far East, maintaining offices in London and Tokyo. These overseas offices seek to exploit the unique capabilities found in other parts of the world and to utilize the expertise gained.

Finally, the ARO has a high interest program called the Scientific Services Program (SSP) which is implemented by means of a contract with Battelle Memorial Institute. The SSP provides customer services in several categories, including a summer faculty program, a laboratory research corporate program, and a workshop and conference support program. The latter has included the biennial Army Science Conference.

The largest SSP category, however, is the Short Term Analytical Services (STAS) program. The STAS program provides nonpersonal, intermittent, short-term scientific and technical support to solve special problems related to research and development activities. Within the scope of the program, the contractor has the responsibility to competitively select qualified scientists and engineers to complete the requested research. These services are performed by individuals who are responsible for an end item (usually a report), free from supervision by the government and free of an employer-employee relationship. Projects are usually shorter than a one year duration.

*ARO: continued*

For further information on the ARO research programs, contact the ARO Research and Technology Integration Office, (919) 549-4204. Inquiries concerning the SSP should be made to the ARO Procurement Office (919) 549-4264.

The Quick Reaction Coordinator for ARO is Dr. Francis X. Hurley, Phone: (919) 549-4322, FAX: (919) 549-4248, DSN: 832, E-mail: [hurley@aro-emhl.army.mil](mailto:hurley@aro-emhl.army.mil)

ARO Website: [www.arl.army.mil/aro](http://www.arl.army.mil/aro)

**U.S. ARMY COMMUNICATIONS AND ELECTRONICS COMMAND  
NIGHT VISION AND ELECTRONIC SENSORS DIRECTORATE  
(CECOM/NVESD)**

a. The mission of the Night Vision and Electronic Sensors Directorate (NVESD) is to conduct research and development to provide U.S. Land Forces with advanced sensor technology to dominate the 21<sup>st</sup> Century digital battlefield. Specifically, these technologies provide the capability to —

- (1) Acquire and target enemy forces in battlefield environments.
- (2) Detect and neutralize mines, minefields, and unexploded ordnances.
- (3) Deny enemy surveillance and acquisition through electro-optic, camouflage, concealment, and deception techniques.
- (4) Provide for night driving and pilotage.
- (5) Protect forward troops, fixed installations and rear echelons from enemy intrusion.

b. Major functional areas include directing the research and development of:

- (1) Optics/image intensification.
- (2) Thermal imaging.
- (3) Tactical lasers.
- (4) Survivability equipment.
- (5) Aided target recognition.
- (6) Sensor fusion.
- (7) Countermeasures (electro-optics, infrared, radio frequency, mines).
- (8) Physical security.
- (9) Radiac.
- (10) Anti-fratricide (Combat ID).
- (11) Modeling/simulation/analysis.
- (12) Low cost low observables/multi-spectral signature reduction.
- (13) Image/signal processing hardware and software.
- (14) Electro-optical, radar measurement and signature intelligence.
- (15) Mine detection and neutralization.
- (16) Battlefield deception/camouflage.

c. Organizational Structure. The NVESD consists of the Office of the Director, supported by a Special Programs Office reporting directly to the Director, and five functional organizations as follows:

- (1) Science and Technology.
- (2) Ground/Air Sensors.
- (3) Countermine.
- (4) Survivability/Radar Systems.
- (5) Technical Support and Operations.

The Quick Reaction Coordinator for CECOM/NVESD is Mr. Mark Walters, Phone: (703) 704-3423, FAX: (703) 704-2152, DSN: 654, E-mail: [mark.walters@nvl.army.mil](mailto:mark.walters@nvl.army.mil)

CECOM/NVESD Website: <https://aries.nvl.army.mil/nvesd/home.html>

**U.S. ARMY COMMUNICATIONS AND ELECTRONICS COMMAND  
RESEARCH, DEVELOPMENT, AND ENGINEERING CENTER  
(CERDEC)**

The mission of the CECOM Research, Development and Engineering Center (CRDEC) is the Army Materiel Command Center for Research, Development and Engineering in Command and Control, Communications, Computers and Intelligence (C4I); Information Warfare/Information Operations; Electronic Warfare; Night Vision and Electro-Optics; Countermine; Power Sources; and Avionics. The Center's mission is focused on providing support to the Program Executive Officers (PEOs), Project Managers (PMs) and other customers; managing technology base programs by defining, developing and acquiring superior technologies; developing, acquiring, testing and evaluating systems; and sustaining and enhancing systems and equipment for a trained and ready Army undergoing revolutionary changes.

The CECOM Research, Development, and Engineering Center (CRDEC) is the AMC Center of Excellence for command, control, communications, computers, intelligence, electronic warfare, and night vision electro-optics. CRDEC's major goals are focused on providing development and acquisition support to the program executive offices and product/program managers; defining, developing, and acquiring superior technology; developing and acquiring non-major systems; and sustaining and enhancing fielded systems and equipment. The CRDEC serves as a link with other producers of state-of-the-art technology, including industry, academia, the foreign sector, and other Government agencies and services. The center leverages programs with a worldwide span of individual research and development (R&D) agreements, joint programs, and pooled resources with U.S. allies to promote and accelerate the application of the most advanced concepts and technologies into evolving systems within the Army's electronic arsenal.

CECOM Website: [www.monmouth.army.mil](http://www.monmouth.army.mil)



## **U.S. ARMY DEVELOPMENTAL TEST COMMAND (DTC)**

The U.S. Army Developmental Test Command (DTC) is a major subordinate command of the U.S. Army Test and Evaluation Command (TEC). It was formerly known as Test and Evaluation Command (TECOM) under the Army Materiel Command (AMC). Although no longer a part of AMC, it retains an affiliate status with the AMC FAST Program.

Headquartered at Aberdeen Proving Ground, Maryland, DTC is the Army's premier materiel developmental testing organization for weapons and equipment. With the largest, most diverse assemblage of testing technology in the Department of Defense, DTC tests military hardware of every description under precise conditions across the full spectrum of arctic, tropic, desert, and other natural and controlled environments on highly instrumented ranges and test courses.

DTC commands six test centers with over five million acres of real estate and associated airspace at 8 locations within the continental United States plus Alaska, Hawaii and Puerto Rico. It also has significant capabilities for conducting/supporting tests at other locations.

DTC works with materiel developers to plan, conduct, and report the results of developmental testing in the most efficient and cost-effective manner to assure that equipment is user-friendly, safe, reliable, easy to maintain, and, above all, does its job. DTC's success hinges on a close, continuous working relationship with Program Executive Officers (PEOs), Program, Project, and Product Managers (PMs), and other customers, on all aspects of materiel system acquisition throughout the life cycle of a system.

Vehicles; munitions; weapons and their components; rockets and guided missile systems and components; command, control, communications and intelligence equipment; air delivery and air transportable equipment; Army aircraft; aircraft system components and related ground support equipment; Chem/Bio detection and defense equipment; general support equipment; training devices; and soldiers' clothing and individual equipment are all tested at DTC. Live fire vulnerability testing is conducted on all major systems that provide protection to soldiers in combat. Live fire lethality testing is conducted on all major weaponry to prove its effectiveness.

DTC develops and acquires advanced test technologies necessary for testing in areas such as artificial intelligence, robotics, directed energy, and smart munitions. With these technologies, DTC develops the capability to answer critical questions regarding future systems' safety, performance, effectiveness, and reliability. DTC makes extensive use of models and simulations (which have been developed and validated using DTC test data) to optimize weapons system test design and procedures.

DTC's unique combination of civilian, military, and contractor personnel work closely with customers to provide quality service and to ensure that American soldiers receive equipment which is proven to be the best in the world.

DTC stands for quality, from its developmental testing of weapons and equipment, to its qualified workforce, and its commitment to customer service. Special emphasis is placed on ensuring that testing does no harm to the environment with which DTC has been entrusted. A variety of programs has been developed ranging from

*DTC: continued*

restoration of wildlife habitats and protection of endangered species to state-of-the-art waste disposal technologies to enhance the environmental quality of DTC's test centers for future generations.

DTC maintains a website at: <http://www.dtc.army.mil/> that contains more detailed information on its capabilities, including the Virtual Proving Ground.

The Quick Reaction Coordinator for DTC is Ms. Cathy Pritts, Phone (410) 278-1421, FAX (410) 278-9170, DSN 298, e-mail: [prittsc@dtc.army.mil](mailto:prittsc@dtc.army.mil)

**U.S. ARMY ENGINEERING RESEARCH AND DEVELOPMENT CENTER  
TOPOGRAPHIC ENGINEERING CENTER  
(ERDC/TEC)**

The Engineer Research and Development Center (ERDC)- is the U.S. Army Corps of Engineers' distributed research and development element. ERDC consists of over 2,000 personnel in eight unique laboratories; five in Vicksburg, Mississippi, and one each in Alexandria, Virginia; Champaign, Illinois; and Hanover, New Hampshire. These laboratories have a total research program of more than \$430 million and more than \$1.2 billion in facilities and equipment. ERDC headquarters is in Vicksburg, Mississippi.

The ERDC [www.erdcl.usace.army.mil](http://www.erdcl.usace.army.mil) focuses on innovative research and development and operational support in: mapping and terrain analysis; infrastructure design, construction, operations and maintenance; structural engineering; cold regions and ice engineering; coastal and hydraulic engineering; environmental quality; geotechnical engineering; and high performance computing and information technology.

The laboratories and their locations are:

- Coastal and Hydraulics Laboratory, Vicksburg, Mississippi;
- Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire;
- Construction Engineering Research Laboratory, Champaign, Illinois;
- Environmental Laboratory, Vicksburg;
- Geotechnical Laboratory, Vicksburg;
- Information Technology Laboratory, Vicksburg;
- Structures Laboratory, Vicksburg; and
- Topographic Engineering Center, Alexandria, Virginia.

**Coastal and Hydraulics Laboratory:** <http://chl.wes.army.mil> Offers unparalleled expertise in shoreline and beach erosion control; flooding and storm protection; design, construction and maintenance of navigation channels, harbors, hydraulic structures, reservoirs, locks, levees and channel realignments for navigation and flood control; coastal and inland dredging; shoaling; salinity problems; groundwater modeling; military logistics-over-the-shore; hydrology; and hydroenvironmental modeling.

**Cold Regions Research and Engineering Laboratory:** [www.crrel.usace.army.mil](http://www.crrel.usace.army.mil) Is a singular facility that addresses the unique problems and opportunities found in the world's cold regions. The laboratory has earned an international reputation of excellence that is sustained by its exceptional technical staff and emphasis on a balance of theoretical, experimental, laboratory and field work. The laboratory gains knowledge of the cold regions through scientific and engineering research. The laboratory serves through traditional military engineering (problems that arise during conflict), military construction and operations technology (building and maintenance of military bases, airfields, roads, ports and facilities), and civil works (navigation on inland waterways, coastal engineering, etc.).

**Construction Engineering Research Laboratory:** [www.cecer.army.mil](http://www.cecer.army.mil) Conducts research and development to support sustainable military installations. Research is directed toward increasing the Army's ability to more efficiently construct, operate, and maintain its installations and ensure environmental quality and safety at a reduced life-cycle cost.

**Environmental Laboratory:** [www.wes.army.mil/EL](http://www.wes.army.mil/EL) Examines the interaction between man and the environment. Environmental expertise is applied to the ecology of estuarine, marine, and freshwater areas; natural and cultural resources management; water quality; management of aquatic nuisance species; projects relating to the environmental impact of dredging and dredged material disposal; wetlands; protection and enhancement of threatened and endangered species; and environmental cleanup and restoration (waste site characterization and treatment of organic waste, explosives, and heavy metals).

**Geotechnical Laboratory:** [www.wes.army.GL/GL\\_homepage.html](http://www.wes.army.GL/GL_homepage.html) Researches man's interaction with the basic materials of the earth's crust: soil, rock, and groundwater. Knowledge gained from this is applied to dam and levee construction, military vehicle mobility and trafficability, pavements, earthquake engineering, and groundwater protection, and contaminant abatement.

**Information Technology Laboratory:** [www.wes.army.mil/ITL](http://www.wes.army.mil/ITL) Develops and sustains the technological infrastructure to support ERDC and executes a broad R&D and operational support program for the DoD. Among the functions encompassed are high-performance computing, high-bandwidth communications, computer-aided engineering, computer-aided design and drafting, geographic information systems, software engineering, scientific visualization, library services, electronic and traditional publishing, records management, animation, photography, and video production.

**Structures Laboratory:** [www.wes.army.mil/SL/SL\\_homepage.html](http://www.wes.army.mil/SL/SL_homepage.html) Lead DoD laboratory for survivability and protective structures. R&D is conducted on the dynamic response of structures to weapons effects; methods of making concrete and other construction materials more durable and less expensive; application of explosives technology to combat engineering missions; and behavior of earth and structure systems subjected to blast loading and projectile penetration. The laboratory is leading the Corps of Engineers effort to devise better ways to evaluate, rehab, and maintain the hundreds of aging civil hydraulics structures operated by the Corps, as well as improve technology for new construction.

**Topographic Engineering Center:** [www.tec.army.mil](http://www.tec.army.mil) Provides the warfighter with a superior knowledge of the battlefield and supports the Nation's civil and environmental initiatives through research, development, and application of expertise in the topographic and related sciences.

The Quick Reaction Coordinator for ERDC/TEC is Mr. Richard A. Herrmann, Phone: (703) 428-6800, FAX: (703) 428-6656, DSN: 328, E-mail: [herrmann@tec.army.mil](mailto:herrmann@tec.army.mil)

## **U.S. ARMY INDUSTRIAL OPERATIONS COMMAND (IOC)**

The U.S. Army Industrial Operations Command (IOC) is a major subordinate command of the U.S. Army Material Command. It was formally established on 1 October 1995, and represents a merger of the (former) U.S. Army Depot Systems Command, Chambersberg, Pennsylvania, with the ammunition readiness and industrial base management missions of the (former) U.S. Army Armament, Munitions and Chemical Command, Rock Island, Illinois. The IOC is headquartered at Rock Island Arsenal, Rock Island, Illinois.

The IOC is a worldwide organization comprised of 43 installations and activities located in 23 states and in six foreign countries. It provides world-class hardware and logistic support to American and allied soldiers through an industrial infrastructure which is second to none in producing quality munitions and large caliber weapons, and in providing a full range of maintenance services for modern weapons.

More specifically, the IOC oversees the activities of all Army depots, depot activities, arsenals, ammunition plants, and other Army industrial activities. The IOC's major responsibilities include the manufacture, storage, maintenance, overhaul, and ultimate demilitarization of today's sophisticated weapon systems and munitions; maintenance of the Army's war reserve stocks; centralized procurement and life cycle management of conventional ammunition for all DoD services; and sustainment of an adequate and responsive defense industrial base.

IOC Website: [www.ria.army.mil](http://www.ria.army.mil)

**U.S. ARMY SOLDIER BIOLOGICAL  
CHEMICAL COMMAND  
(SBCCOM)**

With the combining of Soldier Systems Command and Chemical/Biological Command a current Mission Statement narrative is not available. For a more complete description of SBCCOM's important and varied responsibilities go to their website at: [www.sbccom.army.mil](http://www.sbccom.army.mil)

The Quick Reaction Coordinator for SBCCOM is Mr. David D. Cheney, Phone: (508) 233-4307, FAX: (508) 233-4726, DSN: 256, E-mail: [ofig@natick-emh2.army.mil](mailto:ofig@natick-emh2.army.mil). Alternate is Max Biela, Phone: (508) 233-5413. E-mail: [marcel.biela@natick.army.mil](mailto:marcel.biela@natick.army.mil)

The Quick Reaction Coordinator for SBCCOM/ECBC is Mr. Keith Knight, Phone: (410) 436-2621, FAX: (410) 436-2014, DSN: 584, E-mail: [keith.knight@sbccom.apgea.army.mil](mailto:keith.knight@sbccom.apgea.army.mil)

The Quick Reaction Coordinator for SBCCOMPM Soldier is LTC Cindy Bedell, Phone: (703) 704-1465, FAX: (703) 704-3820, DSN: 654, E-mail: [cbedell@pmsoldier.belvoir.army.mil](mailto:cbedell@pmsoldier.belvoir.army.mil)  
Alternate is Mr. David Nelson, DSN: 654-3828, E-mail: [dnelson@pmsoldier.belvoir.army.mil](mailto:dnelson@pmsoldier.belvoir.army.mil)

## **U. S. ARMY SPACE & MISSILE DEFENSE BATTLE LAB (SMDBL)**

The U. S. Army Space Command is commanded by LTG Edward G. Anderson III from his headquarters in Arlington, VA. ARSPACE is the Army component command to the unified U. S. Space Command located in Colorado Springs, Colorado. The U. S. Army Space Command (Forward) is located in Colorado Springs as well. Commanded by a Colonel, ARSPACE (Fwd) provides CINC USSPACECOM with direct input and support providing a two way conduit for the flow of information regarding warfighter requirements and CINC issues between the Army staff and the CINC's staff. This strong working relationship has produced good results in support of the warfighter, particularly in the area of the consideration of warfighter requirements in the design and development of future space platforms.

The U. S. Army Space Command is a unique Army command dedicated to supporting the Army warfighter with products and capabilities from space. Products from space include satellite communications, satellite imagery, Global Positioning System (GPS) capabilities, weather and early warning of missile launches.

About 50 percent of the command's mission is in the satellite communications arena. The command also manages the Regional Space Support Centers (RSSC) and Theater Directors, the Army Space Support Teams, the Army Theater Missile Defense Element, the Army Space Exploitation Demonstration Program, the Joint Tactical Ground Station, and the Army Astronaut Detachment at the Johnson Space Center in Houston. About 30% of ARSPACE personnel are located in Colorado Springs, the rest are stationed throughout the world enabling the exploitation of space by just about all Army Operations.

The RSSCs and Theater Directors provide "One Stop Shopping" for supported CINCs, to satisfy communications and other space support requirements.

Long haul satellite communications managed by the Army Space Command's 1st Satellite Control Battalion provide worldwide, reliable, high capacity communications to soldiers, other military and other federal agencies deployed around the world.

The Army Space Support Teams provide a pool of unique equipment to provide ground commanders the distinct advantages space products can bring. From small, very portable satellite communications devices to the ability to take satellite imagery, transfer it to large mapping data files and print it out in the field, the Army Space Support Teams play an important part in supporting the warfighter.

The Army Theater Missile Defense Element is a synthesizing capability which allows an American or coalition commander to attack an enemy's missile infrastructure, thereby reducing the threat that missiles, like the SCUD, can be used as a strategic, tactical, or political weapon in future conflicts.

The Army Space Exploitation Demonstration Program takes commercial off-the-shelf and specialized technologies and tests them against the stated needs of the warfighter. The best example of the success of this program is the introduction of GPS technology into the Army during Operation Desert Storm. Other successes from this program include the Joint Tactical Ground Stations (JTGS) which provide early warning of missile launches; the Joint In Theater Injection (JITI) terminal which allows the movement of immense amounts of data



rapidly across the battlefield; and advances in blue force tracking which allow commanders to literally see where their assets are on the battlefield.

A Joint Tactical Ground Station system is deployed in Germany and a second, still a prototype is in Korea. This will be replaced by the objective system in April 1997. JTAGS provides direct, in-theater early warning of ballistic missile launches. The importance of early warning in-theater is the gain in warning time that provides the maximum amount of warning to troops in impact areas and allows for maximum active defensive response to the launches.

The Army Astronaut Detachment provides the Department of Defense a pool of soldiers with space experience. Acting as payload specialists, and in the future, space station crew members, Army astronauts have handled Department of Defense experiments, placed military satellites in orbit, and walked in space.

ARSPACE is also in the process of taking part in the development of a Space Battle Lab. While the scope of its role is still in the planning process, ARSPACE along with other Army Space and Strategic Defense Command and TRADOC elements will provide leading edge support to the warfighter through the development of operational concepts and doctrine for the exploitation and defense of space and space based assets.

The Quick Reaction Coordinator for SMDBL is Mr. Russ Robinson, Phone: (719) 554-4203, FAX: (719) 554-4202, DSN: 692, E-mail: russell.robinson@arspace.army.mil

SMDBL Website: [www.smdc.army.mil/smdbl.html](http://www.smdc.army.mil/smdbl.html)

## **U.S. ARMY SIMULATION, TRAINING AND INSTRUMENTATION COMMAND (STRICOM)**

The Simulation, Training and Instrumentation Command (STRICOM) was activated as a provisional command on 16 March 1992. On 1 August 1992, the command was formally approved by the Army as a Major Subordinate Command of the U.S. Army Material Command.

The current command structure is:

### **MISSION**

Provide training and test simulation, simulator, target and instrumentation products and services to:

- Develop and sustain warfighting skills.
- Create a synthetic environment to evaluate concepts and support requirements definition
- Support material development and test and evaluation.

### **Project Manager For Combined Arms Tactical Trainer (PM CATT)**

Since its inception, STRICOM included the newly created Project Manager for Combined Arms Tactical Trainer (PM CATT). PM CATT manages the Army's largest training simulation contract, which was awarded 30 November 1992 for the Close Combat Tactical Trainer (CCTT). PM CATT expects new programs to emerge from this concept which will utilize the latest simulation technology.

PM CATT is responsible for the development and acquisition of simulators and simulations under the CATT umbrella and for the Family of Simulations (FAMSIM).

### **Combined Arms Tactical Trainer (CATT)**

CATT is a family of networked simulators used for training collective tasks on a combined arms battlefield. The initial CATT effort is the Close Combat Tactical Trainer (CCTT). CCTT is a group of fully interactive networked simulators and command, control and communications work stations, replicating the vehicles and weapons systems of company/team and its supporting combat, combat support, and combat service support elements, operating on a simulated real-time battlefield. The training audience for CCTT is armor and mechanized infantry.

Follow-on programs include Aviation Combined Arms Tactical Trainer (AVCATT), Air Defense Combined Arms Tactical Trainer (ADCATT), Engineer Combined Arms Tactical Trainer (ENCATT), and Fire Support Combined Arms Tactical Trainer (FSCATT) (Phase II).

### **Product Manager, Family of Simulations (FAMSIM)**

PM FAMSIM is responsible for all command and staff simulations under the Family of Simulation (FAMSIM) umbrella.

Corps Battle Simulation (CBS), Brigade/Battalion Battle Simulation (BBS) and Combat Service Support Training Simulation System (CSSTSS) are the current FAMSIM efforts. These simulations systems provide man-in-the-loop command and control training for commanders and their staffs in a realistic stress filled environment. Tactical Simulation (TACSIM) is the intelligence driver for CBS. An additional simulation, JANUS, provides the opportunity for company/team leaders to exercise fighting skills of their platoon leaders in a computer driven environment. The future simulation system, Warfighter Simulation for the year 2000 (WARSIM 2000) has entered the Engineering and Manufacturing Development (EMD) phase of the life cycle.

### **Project Manager for Training Devices (PM TRADE)**

PM TRADE is responsible for development and acquisition of assigned system and non-system stand-alone training devices and simulators for the Army, including for development and acquisition of close combat and synthetic flight training systems and all instrumentation and tactical engagement systems for the Maneuver Combat Training Centers. Endeavors include the development and acquisition of training devices for foreign military sales.

### **Product Manager, Air Combat Training Systems (PM ACTS)**

PM ACTS is responsible for Synthetic Flight Training System (SFTS) simulators, along with all assigned system and non-system aviation training and air defense training devices/systems. Responsibilities are primarily aligned with the Program Executive Office for Air Defense, Aviation, and, when requested, Global Protection Against Limited Strikes (GPALS). Projects include a family of flight simulators for the Army's UH-1, AH-1, CH-47, UH-60, MH-60 and AH-64 helicopters. These simulators allow aviators to experience the sensation of flight in a training environment for a fraction of the cost of actual flight. Other programs include the Air Ground Engagement Systems II (AGES II) the Stinger Troop Proficiency Trainer (STPT), and the Data Automated Tower Simulator (DATS).

### **Product Manager, Close Combat Training Systems (PM CCTS)**

The PM CCTS is responsible for infantry, armor, combat engineer, and special operations forces non-system training devices and systems. Responsibilities are primarily aligned with the Program Executive Offices for Armor Systems Modernization (ASM), Armaments and Tactical Missiles. Active programs include advanced gunnery training systems, precision laser gunnery and missile training devices, maintenance trainer, tank driver trainers, weapons effects signature simulators, videodisc-based gunnery training devices, National Guard armor and infantry training systems, thru-sight video systems, and heavy armored systems. In addition, PM CCTS provides support to numerous Weapons System Project Managers and Foreign Military Sales cases.

### **Product Manager, Combat Support Training Systems (PM CSTS)**

PM CSTS is responsible for the system and non-system devices in support of intelligence and electronic warfare, communications and field artillery; the three Combat Training Centers; and tactical engagement simulations. Programs include: Simulated Area Weapons Effects/Multiple Integrated Laser Engagement System II (SAWE/MILES II), MILES 2000, Joint Readiness Training Center Instrumentation System (JRTC-IS), Range Data Measurement System (RDMS), Intelligence/Electronic Warfare Tactical Proficiency Trainer (IEWTPT), Defense Satellite Communication System (DSCS) Trainers, Field Artillery Trainers (GUARDFIST II), and the Fire Support Combined Arms Tactical Trainer (FSCATT).

### **Project Manager For Instrumentation, Targets, and Threat Simulators (PM ITTS)**

PM ITTS manages the research, development, design, acquisition, fielding, modifications, and capability accounting of major instrumentation, targets and threat simulators required for technical and operational test and evaluation for the U.S. Army. PM ITTS also operates and maintains targets for test and training. PM ITTS is structured with three management offices that function as project managers. Additionally, PM ITTS is responsible for the augmentation of Distributed Interactive Simulation (DIS) with ITTS programs, management of validation for targets and threat simulators, ITTS long range planning and management of the Army Test Facilities register (TEST FACS).

The Instrumentation Management Office (IMO) is responsible for the development and acquisition of major instrumentation for the Army's developmental and operational test ranges. Major instrumentation is generally defined as those efforts that are not system specific, may have joint applications, have high visibility or a large dollar value, generally a total acquisition cost in excess of \$5M. Additionally, manages efforts funded by Central Test and Evaluation Investment Program (CTEIP) and the Resource Enhancement Program (REP). The Targets Management Office (TMO) is located at Redstone Arsenal, Alabama. This office is responsible for the management of aerial and ground target development, operation and maintenance in support of Army Test and Evaluation (T&E) and training. TMO also manages foreign material in support of testing.

The Threat simulator Management Office (TSMO) located at Redstone Arsenal, Alabama, develops and fields realistic threat environments for developmental and operational test and evaluation of Army tactical systems, and when practical, training of Army and other service forces.

### **Project Manager for Distributed Interactive Simulation (PM DIS)**

PM DIS duties include development and supervision of the Modernization Program of the DIS synthetic environment. PM DIS is responsible for planning, coordinating and controlling the concept formulation, design, development, customer interface, and initial sustainment of those networked simulator and simulation elements which together are called the Synthetic Environment.

Explicit in this modernization is developing and managing the funding documents by which this modernization is possible. Included are networked combined arms simulators (Virtual Simulation), analytic models and/or war games (Constructive Simulation) and instrumented ranges and field exercises (Live Simulation). The PM provides coordination, and support to the material development and acquisition activities of STRICOM's other PMs (CATT, ITTS, and TRADE), as well as mapping out the future technical vision for the DIS domains

of Training, Exercises, and Military Operations (TEMO); Research, Development and Acquisition (RDA); and, Advanced Concepts and Requirements (ACR). PM DIS assures the cost effective integration of maturing technologies from the various users of Distributed Interactive Simulation, such as the ATDs, Battle Labs, LAM and system actions of CATT and FAMSIM programs.

### **Product Manager, Combined Arms Assessment Network (PM CAAN)**

PM CANN manages the scheduling, utilization and modernization of the Combined Arms Assessment Network (CAAN). This responsibility includes the management of both the technical improvements and the operational applications at the Army's Core DIS Facilities (CDFs). The CDFs are currently comprised of the following: Aviation Test Bed, Fort Rucker, AL; Land Warrior Test Bed, Fort Benning, GA; Mounted Warfare Test Bed, Fort Knox, KY; and the Operational Support Facility, at Orlando, FL. PM CAAN is the primary POC for the coordination, integration, and execution of test bed DIS events involving customers such as the Battle Labs, LAM Task Forces, and R&D programs which use simulation for combat development, material development, training development, and test and evaluation activities. Additionally, PM CANN has the major responsibility of managing the needs of the User community. This includes education for the user of exactly what DIS is, translating their functional requirements into technical capabilities, and monitoring user requirements for input into the Modernization process.

### **Assistant Project Manager for Distributed Interactive Simulation (APM DIS)**

APM DIS assesses future DIS requirements and develops related policy, plans and programs. Responsibilities include long term DIS assessments and projection of needs and capabilities, plus maintenance of the DIS Modernization Plan and development of inputs to Master Plans.

### **Simulators, Simulation and Modeling Technology Base**

The primary focus of STRICOM's Technology Base is on the Battlefield Distributed Simulation - Developmental (BDS-D) program. The BDS-D system serves as the showcase for the Army's distributed interactive simulation capability linking government, university, and industry sites in an accredited, real-time, warfighter-in-the-loop simulation of the joint and combined battlefield. It will support material development, combat development, and operational testing by providing a cost effective alternative to proof-of-principle demonstrations, field test, and operational evaluations in all phases of force development. The program approach addresses interoperability of systems including simulation for command and control, simulators for weapon systems, actual operational systems, and Computer Generated Forces (CGF). An open system design architecture, with a common set of protocols and standards to achieve interoperability of simulations, will be the keystone of the program development. BDS-D will also provide a mechanism to continue research and development of networked distributed simulations and simulators for use in supporting contingency planning; in developing and testing doctrine and organization; in training and leadership development; in development of material concepts and requirements; and in designing field tests.

STRICOM is the focal point for simulator, simulation and modeling technology, and as such, ensures that communication between user and technology developer is effective and assures the continuous transfer of technology from exploratory programs to future developments.

Coordinated efforts with the Defense Advanced Research Project Agency (DARPA) and with Navy, Marine Corps, and Air Force are developing sources of technology while avoiding duplication of effort and maximizing the use of resources available in laboratories of other government agencies, universities, and private industry.

Technology areas of interest are:

### **Networked Battlefield Distributed Simulation Technology**

Supporting interactive networked simulators to train combined arms forces and provide for test and evaluation of future weapons systems, tactics and doctrine. Provide simulation models to train units in a variety of actions-in-short-of-war missions, to include disaster relief, deployment, redeployment, peacekeeping, non-combatant evacuation operations, U.N. security force duty and civil emergencies.

### **Speech Recognition and Speech Synthesis Technology**

Critical to the human-computer interaction in DIS, is the integration of speech recognition and speech synthesis capabilities into semi-automated forces. Required capabilities include large vocabulary with high perplexity, continuous speech, spontaneous speech, speaker independent recognition, robustness to background noise, and real-time. This technology is required to be utilized in BDS-D, WARSIM 2000, and CATT/CCTT.

### **Computer Generated Forces (CGF)**

Developing and demonstrating methods and computational approaches to efficiently portray and reconfigure critical behaviors and essential characteristics of intelligent computer generated forces for distributed interactive simulations. Developing and demonstrating extension battlefield functionality of Semi-Automated Forces (SAFOR).

### **Dismounted Infantry Integration**

Create a multi-sensory realtime simulation of the battlefield that immerses the individual soldier in three-dimensional geographical space utilizing virtual reality (head mounted stereoscopic displays, 3-D audio systems, position tracking devices, and innovative input devices such as instrumented gloves). Networked virtual reality devices will integrate individual soldiers into distributed interactive simulation synthetic environments. Additionally enhanced representation of the individual soldier in the SAFOR is required.

### **General Linkage of Simulation/Simulators**

Developing and demonstrating capabilities to link interactive simulations with other simulations and simulators to allow individuals and combat teams/units to prepare for warfighting by participating in simulated combined arms battles.

**Combat Training Center/Tactical Engagement Simulation (CTC/TES) Technology**

Investigating potential solutions to meet future TES requirements for the next generation of weapon systems with extended engagement ranges, adverse weather operations and smart munitions.

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## **U.S. ARMY TANK-AUTOMOTIVE AND ARMAMENTS COMMAND (TACOM)**

The U.S. Army Tank-automotive, and Armaments Command (TACOM) in Warren, Michigan has assumed operational control of three major commodity-oriented activities. This is a result of Base Realignment and Closure (BRAC) decisions and related AMC initiatives which established the U.S. Army Industrial Operations Command (IOC); disestablished the U.S. Army Armament, Munitions and Chemical Command (AMCCOM); disestablished the U.S. Army Belvoir Research, Development and Engineering Center (BRDEC); transferred the U.S. Army Armament and Chemical Acquisition and Logistics Activity (ACALA) to TACOM in place; transferred the U.S. Army Armament, Research, Development and Engineering Center (ARDEC) to TACOM in place; and, transferred five business areas from BRDEC to TACOM. TACOM also assumed control of Red River Army Depot and Anniston Army Depot on 01 October 1999.

The five business areas from the U.S. Army Belvoir Research, Development and Engineering Center (BRDEC) are Bridging, Water Purification (includes fuel handling and water handling), Fuels and Lubricants, Countermobility (defined as the non-electric part of countermining), and Supply. These missions and associated spaces will physically relocate to Warren, Michigan.

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**U.S. ARMY TANK-AUTOMOTIVE AND ARMAMENTS COMMAND  
ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER  
(TACOM-ARDEC)**

The mission of the Armament Research, Development and Engineering Center (ARDEC) is to conduct or manage research, development and life-cycle engineering, including product assurance, engineering in support of items in production and integrated logistics support for assigned armament, munitions systems and material; to provide procurement and management of initial production quantities and technical support to soldiers and equipment in the field; and to maintain a technology base to facilitate the design, development, procurement, production and live-cycle support of assigned material or transition technologies.

ARDEC is a business center of the Tank-automotive and Armaments Command (TACOM), Warren, Michigan, a major subordinate command of the U.S. Army Material Command. The headquarters of ARDEC is located at Picatinny Arsenal, NJ and has subordinate organizations located at Rock Island Arsenal, Illinois and Watervliet Arsenal, New York.

ARDEC provides the United States military with the firepower to achieve battlefield victory. ARDEC is also the Army executive agent for pollution prevention research and development.

ARDEC's primary function will continue to be the DOD's "smart buyer" for armaments. ARDEC retains the technical knowledge and expertise for current, historical and future experimental developmental ammunition and weapon systems, many of which have no counterpart in American industry. ARDEC must be active in all phases of the life cycle process. ARDEC performs unbiased system analysis that considers a diverse number of systems and technologies, both in-house and contractor development, that results in the best technical approach and best buy decisions. ARDEC also performs unbiased technical assessments of the current state-of-the-art in ammunition and weapon systems that point the way to future developmental programs. In this capacity, ARDEC is the critical "bridge" between the Armed Forces and the armaments community.

ARDEC's basic strategy is to better serve our ultimate customer, the men and women of the Armed Forces. In reality, ARDEC has many customers who all have unique demands. We strive to meet the challenge of achieving total customer satisfaction by listening and learning, benchmarking the best, and measuring results and trends. ARDEC's customer base stretches from the Army Headquarters to many subordinate Defense units who use our technical services or products, to foreign governments, and to small businesses who seek to apply our talents to create new technology.

Our core technologies have been aligned into ten (10) commodity-oriented business areas are a mixture of systems integration and key functional technology areas that are most critical for future weapons development. Virtually all ARDEC projects are aligned into the business areas listed below:

***Smart Munitions*** - To develop self-contained munitions for all mission areas with the ability to autonomously sense, engage, and kill a target. EXAMPLE - SADARM Warheads.

***Indirect Fire*** - To maximize defeat of enemy personnel and vehicular targets by developing advanced artillery with extended range and accuracy. We will achieve autonomous operations, increase range, increase rate of fire, and reduce manpower requirements over current fielded systems. EXAMPLE: CRUSADER Howitzer

**Direct Fire** - To develop weapons and munitions which will defeat the most advanced enemy armor through increased frontal penetration, higher hit probabilities, and enhanced top attack capabilities, while reducing crew size and stress. EXAMPLE - EM Gun Tank

**Soldier Weapons** - To upgrade armaments for light infantry and special operation forces (SOF), and to develop advanced small caliber weapons that will significantly increase kill capability, enhance survivability and improve the capability to destroy hard targets, and to develop non-lethal weapons for low intensity/peace keeping missions. EXAMPLE - Objective Crew Served Weapon

**Mines & Demolitions** - To defeat advanced helicopters, vehicles and personnel with highly intelligent mine-fields, with features such as wide area destruction, complete user control and Identification Friend or Foe (IFF) capability. EXAMPLE - Wide Area Mine

**Gun Propulsion** - To develop advance propulsion mechanisms (including liquid propellant and electromagnetic/electrothermal), and improve conventional gun propulsion technologies by increasing projectile weight, velocity, accuracy, and range while decreasing the soldier's logistics burden. EXAMPLE - Liquid Propellant Gun

**Fusing & Lethal Mechanisms** - To greatly increase the lethality of armament material by focusing on advanced chemical energy warheads (shaped charge and explosively formed penetrators), kinetic energy (KE) penetrators, associated warhead materials, and low collateral damage munitions. Also, to create fuzes with integrated sensors, signal processing, and guidance and control; capable of performing target/clutter discrimination and having multioption capability with autoloaders, and containing electronic safe and arm (S&A) functions. EXAMPLE - Tank Armaments SADARM Projectile.

**Fire Control** - To provide life cycle engineering and management of fire control subsystems, software, command, control and communications; test, maintenance and diagnostic equipment and training devices utilizing an integration of sensors, computers, advanced controls and artificial intelligence aids for a rapid response to command orders of engagement. EXAMPLE - PALADIN

**Munitions Survivability** - Munitions Survivability is a comprehensive approach to insure the Survivability of the CINCs' critical warfighting assets. It consists of three primary pillars; proposed Munitions Logistics Advanced Concept Demonstration (MLS-ACTD), proposed Munitions Survivability Integration Program (MSIP) and the Hazards of Electromagnetic Radiation to Ordnance (HERO) Certification Program. The MLS-ATD consists of five projects (airborne secured area survivability and clearance, seaport survivability and clearance, and energy resupply). The MSIP will provide "built in" survivability improvements that will help preclude destructive reactions within logistics nodes, transportation assets and combat vehicles using proven/available technologies. The HERO effort assesses the susceptibility of high priority munitions to electromagnetic hazards. The MSP is Joint and is keyed to needs identified in the Defense Planning Guidance (DPG).

**Pollution Prevention** - ARDEC is the Army agent for pollution prevention R&D, providing the Army with technical management for pollution prevention R&D, integration of pollution prevention concerns into the weapons system R&D process, and technical assistance and integration expertise to the Army, other government agencies, and industry.

**Fielded Systems** - ARDEC is a world leader in munitions technologies and continues to provide state-of-the-art systems to its customers - the soldiers in the field. The following descriptions illustrate some of ARDEC's most successful systems and detail the weapon systems which ARDEC has helped to put into the field:

The **M829A1**, also known as the "silver bullet", is an excellent example of ARDEC's world class weapons technology being transitioned into a fielded system. The M829A1 is widely regarded as the most effective tank-fired anti-armor weapon in the world, and was used extensively against Iraqi armor during Operation Desert Storm. The M829A1 is a depleted uranium long rod kinetic energy penetrator round capable of defeating heavily armored vehicles. ARDEC is working toward fielding the M829A2, which will enhance the round by increasing its velocity and improving its terminal effect. The improved performance was attained by implementing new composite material technology and a new propellant with a higher loading density.

The **M712 Copperhead** projectile is another example of ARDEC's ingenuity. Copperhead was the first smart artillery round ever developed. Its accuracy is measured in centimeters and its lethality is impressive. Copperhead is a cannon-launched 155mm artillery projectile which guides itself to a laser-designated target. The munition is capable of defeating both armor and point targets at ranges of over six kilometers and provides the battlefield command anti-material/anti-personnel grenades at ranges out to twenty nine kilometers.

The **M16A2** semiautomatic rifle is the standard by which all military rifles of the future will be judged. This variant of the M16, developed by ARDEC, fires a three-round burst in semiautomatic operation. The system incorporates an adjustable rear sight which corrects for both wind and elevation, a heavier barrel with 1-in-7 rifling, and a muzzle compensator to prevent muzzle climb during semiautomatic operation. The M16A2 is capable of firing all NATO standard 5.56mm ammunition and can fire 40mm grenades when equipped with the M203 Grenade Launcher.

ARDEC is a world leader in the design and development of Mortar Systems. Under the direction of Project Manager, Mortars, ARDEC has fielded many systems including the 60mm Lightweight Company Mortar System, the improved 81mm Mortar System, and a 120mm Battalion Mortar System. Some of ARDEC's most notable accomplishments are the 81mm blast attenuation device, which allows the mortar to be fired at longer ranges due to reduced blast over pressure, the 60mm and 81mm multi-option fuzes, which provide mortar crews with an air burst capability; and the first 81mm infrared illumination round in the world.

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## **U.S. ARMY TANK-AUTOMOTIVE AND ARMAMENTS COMMAND RESEARCH, DEVELOPMENT AND ENGINEERING CENTER (TARDEC)**

U.S. Army TARDEC is the nation's laboratory for advanced automotive technology. TARDEC's mission is to conduct research, development, and engineering to maintain global technological superiority in military ground vehicles and to advance the role of science in the broader national interest.

TARDEC's headquarters and tank, automotive laboratories are located at the Detroit Arsenal in southeastern Michigan. RD&E are conducted in military bridging, fuel, lubricants, and water technologies, as well as mechanical countermeasure apparatus and specialized logistics equipment at its Fort Belvoir, VA labs. Break-throughs in fuel technology are pursued at TARDEC's Fuels & Lubricants Lab at Southwest Research Institute in San Antonio, Texas.

TARDEC's associates now work in a self-directed team organization with five major business groups: Research, Development, Engineering, Technology Transfer, and Operations.

### **Research Business Group**

TARDEC's Research Program is structured to project technology that will provide an overwhelming force dominance with minimum casualties. This business group assembles TARDEC's experts in the areas of mobility, survivability, vehicle electronics, and vehicle integration. Objectives: Recognize worldwide state-of-the-art in key technologies and know the world's experts; harvest technologies worldwide, create and promote state-of-the-art technologies; demonstrate leap-ahead tank-automotive technologies; and transition to new developmental programs and insert into existing military and commercial systems. As a result of base realignment and closure, TARDEC recently expanded its technology spectrum with the acquisition of the former Belvoir Research, Development, and Engineering Center's Water Technology, Tactical Bridging, Fuels and Lubricants, Countermobility, and Fuel and Water handling Areas. This business group is also responsible for the Composite Armored Vehicle, Hit Avoidance, Advanced Tank Technologies and Crewman's Associates Advanced Concept Technology Demonstrators, as well as the Hunter Vehicle.

### **Development Business Group**

The Development Business Group was formed to focus development activities within TARDEC into a working activity. The former Advanced Systems Concepts Office, Design and Manufacturing Technology Directorate, Systems Simulation Division, RAM/Analysis & Data Division provides the foundation of the new Development Business Group. TARDEC's strategic plan outlines the ownership of goals and objectives guiding the operation of the group. The formation of empowered teams will make the target objectives a reality and the focus on customer satisfaction will remain the cornerstone of the group's performance. Vision: to develop world class, technologically superior ground vehicle systems for our customers. Mission: to meet the needs of the customer, during system development, by providing planning, evaluation, integration, design, simulation, fabrication, and execution of ground vehicle programs and processes by using analytical and physical methods and tools.

### **Engineering Business Group**

The Engineering Business group consists of three teams: Engineering Data, Quality Assurance, and Systems Engineering, which divide into many component/vehicle systems teams.

Mission: to provide engineering support to weapon systems managers during development, acquisition, and fielding cycles of the Tank, Automotive and Armaments Command-managed vehicles. This support includes technical data documentation, quality engineering, and quality assurance. It establishes and updates technical requirements and resolves engineering and quality problems of fielded hardware. This group continually seeks out to implement new and improved processes.

### **Technology Transfer Business Group**

The Technology Transfer Business Group is comprised of associates assigned to the National Automotive Center. This group serves as the Army's focal point for the development of dual-use automotive technologies and their application to military ground vehicles. The Business Group is comprised of four teams: manufacturing, technology, operations, and research. All teams are actively involved in key national initiatives like the PNGV and Intelligent Transportation System. The NAC dedicates itself to helping both the Army and industry acquire and apply affordable state-of-the-art automotive technology. Major objectives: accelerate NAC initiatives; facilitate joint R&D with industry, government, and academia; share technology advancements through CRADAs; help our neighboring communities become centers of expanding opportunity and economic growth.

### **Operations Business Group**

This business group consists of TARDEC's primary staff personnel whose job it is to assist all other internal customers. Its members: the Business Operations Manager, Executive Assistant for Administration, TARDEC University's Dean, the TARDEC Facilities Engineer, Automation Advisor, and Customer Relations Advisor. More information on TARDEC can be found on the web at: [www.tacom.army.mil](http://www.tacom.army.mil)

## **U.S. ARMY TRAINING AND DOCTRINE COMMAND (TRADOC)**

The U.S. Army Training and Doctrine Command (TRADOC) is a major Army command. It is responsible to Department of Army for training, doctrine and combat development. The TRADOC Commanding General reports directly to the Chief of Staff of the Army.

### **TRADOC Mission**

- Assess the Force
- Train the Army for War
- Set the Army's Standards and Requirements
- Command Assigned Activities and Installations

### **TRADOC Vision**

To prepare the Army for decisive victory in the full range of required joint and coalition operations through:

- Accessing and training the Army's soldiers and leaders and providing disciplined combined arms training environments for units.
- Balanced development of concepts, requirements, and products in doctrine, training, leadership, organizations, materiel, and soldiers.
- Providing readiness infrastructure for training and projecting army forces.
- Building a command environment that promotes safe, values-based, and disciplined operations.

### **COMMAND PRIORITIES**

1. Remain committed to Army near-term readiness:
  - Train the load.
  - Access the force.
  - Provide mission support required to train the load.
2. Sustain TRADOC's readiness capability to perform our mission:
  - Maintain core requirements for the daily business of TRADOC.
  - Improve soldier quality of life.
  - Maintain and operate installations and facilities.
3. Prepare the Army for the future: Develop soldiers, leaders, doctrine, materiel, training, and organizations to meet tomorrow's land combat challenge.

Training and Doctrine Command is leading the U.S. Army from a Cold War Army to a smaller, tailored, modernized, more lethal Army. TRADOC is now a partner in building the Army of the 21st Century -- Force XXI. In order to do that, TRADOC will transform itself to TRADOC XXI.



Transformation encompasses five areas -- doctrine, training, combat developments, reengineering and quality of life.

## **Doctrine**

Doctrine captures the view from the "intellectual mountaintop" of the future, and anticipates change rather than reacting to it. Ideas typically lead physical change, but when "breakthrough" physical developments occur doctrine rapidly synthesizes them. TRADOC provides concepts incorporating these new developments into the larger picture. In future doctrine, the Army is the decisive ground force partner in joint and combined operations.

## **Training**

TRADOC instills in its soldiers a strong warrior ethos and a desire for professional growth. Quality of training will not change; means and techniques will. New training techniques are supported by a system of tasks, conditions and standards that is a hallmark of Army training. The command is demonstrating the value of distance learning and the use of virtual, constructive and live simulations in training.

## **Combat Developments**

Soldiers are the U.S. Army -- enabled, not encumbered by technology. Technology helps well-trained soldiers and leaders accomplish their missions.

New ideas and equipment are tested in battle laboratories. Battle Labs perform experiments through virtual and constructive simulations, and with soldiers in the field. Labs also led to streamlined procurement methods. Advanced warfighting experiments, instrumental in designing Force XXI, evolved from battle labs.

## **Reengineering**

TRADOC began reengineering itself to be affordable and flexible in meeting Army needs into the 21st Century. Now, as a Reinvention Center, TRADOC will have the authority and flexibility not only to continue to improve itself, but to help reinvent the Army.

## **Quality of Life**

Reengineering initiatives improved living and working condition for TRADOC soldiers, civilian employees and families -- many improvements now used throughout the Army. The strength of TRADOC is its military and civilian team -- innovative, creative and energetic. People share a common vision, "try things" and care for each other. That makes TRADOC a resolute leader in this period of change and turbulence.

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